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The Psychosocial Well-Being of Children From Fly-In/Fly-Out Mining Families

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The Psychosocial Well-being of Children from Fly-in/Fly-out Mining Families

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A Report Submitted in Partial Fulfiiment of the Requirements for the Award of
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Abstract

The children of fly-in/fly-out (FIFO) mining employees are exposed to the risk factors for depressive disorders of regular father absence associated with hazardous employment conditions, together with disruptions to family routines. In the absence of previous research in this area, this exploratory study sought to determine whether the levels of depressive symptomatology, anxiety and perceptions of family function of 30 primary school-aged children whose fathers were in FIFO employment were less healthy than those of a Control Group of 30 children whose fathers did not have FIFO employment. The mothers' perceptions of family function were also compared. The children were matched on age and gender. Analysis comparing the two groups of children's scores on the Children's Depression Inventory (Kovacs, 1992), the Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 2000), and the General Function sub-scale of the McMaster Family Assessment Device (Epstein, Baldwin 7 Bishop, 1983), found no significant differences. Both groups were functioning at healthy levels in the three areas. Significant differences between the scores of the two groups of mothers on the Communication, Affective Response, Affective Involvement, Behaviour Control and General Functioning sub-scales of the FAD were found. In addition, the FIFO mothers perceived unhealthy family function in the areas of Roles and Affective Involvement. These results indicate that further research, focussing on mediating variables including mothers' wellbeing and FIFO characteristics, is warranted to clarify the impact of FIFO employment on families and children.

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Submitted: October 2001

Declaration

! certify that this thesis does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any institution of higher education and that, to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

Signature: 

Date: 29 October 2001

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Introduction

The incidence of young people with depression or other mental health problems has been increasing over the last decade (Capp, 2001, Roberts 1999). Eight percent of those adolescents surveyed in the 1998 Australian National Survey of Mental Health and Well-being were identified as having depressive symptomatology. This included both self-report and parental reports of the disorder (Rey, Sawyer, Clarke & Baghurst, 2001). Similarly, a recent health survey of Western Australian children indicated that sixteen percent of children aged from four to eleven years had some type of mental health problem including anxiety and depression, thought and attention problems, social problems and aggressive behaviour (Zubrick, Silburn, Garton, Burton, Dalby, Carlton, Shepherd, & Lawrence, 1995). Mental illness can be regarded as the second most common health problem affecting Western Australian children (Silva, Palandri, Bower, Gill, Codde, Gee, & Stanley, 1999).

These findings described above provide Australian based support for earlier international reviews which suggested that mild to moderate depression is more likely to be manifested at an earlier age, and that moderate to severe depression is experienced by ten to fifteen percent of children (Birmaher, Ryan, Williamson, Brent, Kaufman, Dahl, Perel & Nelson, 1996; Goodyer, Herbert, Tamplin, Secher, & Pearson, 1997; Hannan, Rapee, & Hudson. 2000).

Such figures as these are of concern as it has been shown that mild depressive symptoms are predictors of the later development of clinical depression, and that childhood depressive disorders are associated with

adolescent and adult disorders (Goodyer, et al., 1997; Hannan, et al., 2000; Kovacs, 1996; Rao, Ryan, Birmaher, Dahl, Williamson, Kaufman, Rao, & Nelson, 1995; Roberts, 1999). Childhood depressive disorders have been found to have a negative impact on self-esteem, physical health, academic performance, and social competence (Michael & Merrell, 1998). Rey et al. (2001) found that depressed adolescents exhibited higher rates of health-risk behaviours and psychosocial impairments than non-depressed adolescents. Childhood depression has also been identified as a major risk factor for later suicidal ideation (Kovacs, Goldston, & Gatsonis, 1993; Last, Hansen & Franco, 1997; Rey et al., 2001). Similarly, anxiety can impact on children's academic performance and social competence (Bernstein, Borchardt, & Perwein, 1996; Reynolds & Richmond, 2000). The effects of anxiety and depressive disorders are commonly revealed in disturbances of feelings, behaviours and thoughts - which result in distress to the individual and others - and impeding of coping, competency and mastery (Zubrick et al., 1995).

There is evidence of high comorbidity of depression and anxiety in children, both of which are interrelated clinically (Cole, Peeke, Martin, Truglio, & Seroczynski, 1998; Kovacs, 1996; Manassis & Hood, 1998; Michael & Merrell, 1998; Rao et al., 1995; Roberts, 1999). Kovacs (1996) reported that some type of anxiety disorder is the single most prevalent diagnosis in conjunction with depression, with one third of clinically depressed juveniles suffering from an anxiety disorder. The additional presence of an anxiety disorder can lead to an increase in the severity and duration of depressive symptoms (Bernstein et al., 1996). Cole et al. (1998) provide evidence that the mean age of children with anxiety disorders is younger than that of

children with depressive symptomatology, and that children with comorbid depression and anxiety tend to be older than children with anxiety alone. Anxiety has been identified as a risk factor for depression in children, however, it must be remembered that the presence of an anxiety disorder does not necessarily predict depressive symptomatology (Montgomery, 1990; Rao et al., 1995). Western Australian children have been reported as having anxiety rates of between 20 and 30 percent (Hannan, et al., 2000; Roberts, 1999; Zubrick, et al., 1995), and in general girls exhibit more symptoms than boys, and younger children have more anxiety than older children (Zubrick et al., 1995).

The association between depressive symptomatology and anxiety has been established, as has the incidence of their high comorbidity, but the actual relationship between these two disorders has yet to be clarified (Cole et al., 1998). However, it has been recognised that they are the two most prevalent childhood mental health problems (Kovacs, 1996). As a consequence, this review will address them as separate but closely associated disorders, both of which share common risk factors and both of which have a negative impact on children's psychosocial wellbeing.

Emotional and behavioural problems in children have been described as belonging to one of two main dimensions. Internalising behaviours are those inner directed or over controlled expressions of distress, and externalising behaviours are outer directed and under controlled (Michael & Merrell, 1998; Silverman & Kurtines, 1996). Both depression and anxiety are identified as internalising behaviours. Because of the limited knowledge about the pathological processes involved in depression and anxiety, it has

become customary to diagnose both of these conditions by symptomatology using multi-modal assessment techniques rather than by using aetiology (Montgomery, 1990). Child depressive symptomatology has similar presentation and course to the adult disorders of dysthymia and major depression and is characterised by sadness, social withdrawal, somatic complaints, irritability and lack of interest in everyday activities (Roberts, 1999), although irritability is likely to be more obvious in children (Kovacs, 1996).

In contrast, the diagnosis of anxiety presents the dilemma of how to distinguish an anxiety disorder from apparently "normal" anxiety (Bernstein, et al, 1996). A certain level of anxiety is normal from time to time in everyday life. "Everyday anxiety" results in arousal of the autonomic system often leading to somatic symptoms such as sweating palms or palpitations. Such anxiety is acceptable if it leads to appropriate actions, and can, in fact optimise actions in certain situations. However, the anxiety is of concern if the symptoms impair daily functioning and the individual can no longer respond appropriately to everyday life (Silverman & Kurtines, 1996). Symptoms of anxiety in children include over concern with competence, excessive need for reassurance, fear of the dark, fear of harm to an attachment figure, and somatic complaints (Bernstein et al., 1996). There is, however, an overlap of symptomatology between anxiety and depressive disorders (Clarizio, 1994; Montgomery, 1990). Feeling sad, lonely, fearful, unloved or worthless are some common indicators of depression and anxiety (Zubrick et al., 1995).

In summary, previous research studies have established that childhood anxiety and depression are distinct but intimately associated disorders which overlap in symptomatology, have a high rate of comorbidity and are common childhood psychological disorders. In addition, anxiety has been shown to be a risk factor associated with the duration and severity of childhood depressive symptomatology.

Risk Factors Associated with Depressive Symptomatology and Anxiety

Family factors and negative life events.

A number of risk and protective factors associated with depressive symptomatology and anxiety in children and adolescents have been identified through both psychosocial and genetic research (Goodyer, Cooper, Vize, & Ashby, 1993). In particular, family factors such as poor family function, parent/child relationships, and maternal psychopathology together with exposure to stressful or negative life events have been identified as primary risk factors linked to childhood depression and anxiety (Goodyer, Wright, & Altham, 1988; Goodyer et al., 1997; Jensen, Richters, Ussery, Blodeau, & Davis, 1991a; Puig-Antich, Kaufman, Ryan, Williamson, Dahl, Lukens, Todak, Ambrosini, Rabinovich, & Nelson, 1993; Stein, Williamson, Birmaher, Brent, Kaufman, Dahl, Perel, & Ryan, 2000; Roberts, 1999; Tiet, Bird, Davies, Hoven, Cohen, Jensen, & Goodman, 1998).

Family factors and negative life events are closely associated as risk factors. Manassis and Hood (1998) found that psychosocial adversity contributes to anxiety in children. Compared with normal controls, children who have a history of depressive symptomatology are more profoundly affected by stressful life events (Goodyer, Kolvin & Gatzanis, 1987), are more

likely to come from a family with poor family function (Puig-Antich et al. 1993, Tamplin, Goodyer & Herbert, 1998), low family cohesion (Fendrich, Warner, & Weissman, 1990), and are more likely to have a mother who has experienced anxiety or depressive symptomatology (Downey & Coyne, 1990; Goodyer, et al., 1993; Zubrick et al., 1995). Attachment difficulties have also been identified as family risk factors associated with depressive symptomatology and anxiety (Bernstein, et al., 1996, Roberts, 1999). In particular these include insecure attachments, separations and loss of attachment figures, disorganised attachments, and failure to form attachment between the ages of 6 months and 3 years (Main, 1996). Further research is needed to clarify the specific relationships between attachment difficulties and depressive and anxiety disorders (Main, 1996, Roberts, 1999).

There is evidence that populations of children who are at high risk of developing depressive symptomatology and anxiety may be exposed to multiple risk factors such as negative life events and maternal psychopathology (Goodyer et al., 1988; Tiet et al., 1998). However, the complex way in which multiple risk factors interact and impact on children's levels of risk is not yet understood.

In addition to the family factors and negative life events, Roberts (1999), in her review of the literature, also identified risk factors related to individual child characteristics, cognition and personal competence

Individual child characteristics.

The three main individual child risk characteristics are genetic predisposition, comorbidity with another illness, and previous depressive episodes. There is evidence from twin and adoption studies of the influence

of genetic factors and gene-environment interactions. however, these studies also confirm that genetic factors are not the sole determinants (Downey & Coyne, 1990; Goodyer et al., 1993; Rutter, Macdonald, Le Couteur, Harrington, Bolton, & Bailey, 1990). Other studies suggest a possible constitutional or genetic predisposition to anxiety and depression that can be exacerbated by negative environmental events (Clarizio, 1994; Manassis & Hood, 1998).

Comorbidity between childhood disorders is the second individual risk factor highlighted by Roberts (1999). Numerous studies have identified anxiety disorders and disruptive disorders to be among the most common comorbid diagnoses with childhood depression (Birmaher, et al., 1996; Cole et al., 1998; Kovacs, 1996). The influence of the third identified childhood risk factor of previous depressive episodes has been confirmed in numerous research studies (Birmaher et al., 1996; Cole et al., 1998; Hannan et al., 2000; Kovacs, 1996).

Cognitive risk factors.

Cognitive risk factors associated with childhood depression and anxiety include cognitive errors and pessimistic attributions both of which have been associated with negative self-perceptions. Although findings from research studies provide support for the influence that negative self-perceptions can have on childhood depressive symptomatology they also provide evidence which suggests the salience of these influences follows a developmental progression (Roberts, 1999). During early to middle childhood when cognitive style may still be forming, negative life events may result in negative cognitions which in turn result in depressive symptoms, whereas by

late childhood and early adolescence, cognitive style may be more stable and act as a filter for important life events. In older children depressive symptoms may result from the child's interpretation of negative life events (Roberts, 1999). Although the association between cognitive factors and childhood depression and anxiety has been established, further research would allow a better understanding of how cognitive style, and in particular self-schemas, develop (Roberts, 1999).

Personal competence risk factors.

Personal competence, which includes social problem solving, social skills and interpersonal functioning, has been associated with depressive symptomatology in children. However it is unclear whether poorer personal competence, particularly interpersonal and social skills, is the result of the depression, or whether lower personal competence places the child at greater risk of developing depressive symptoms (Roberts, 1999).

In summary, the risk factors associated with childhood depressive symptomatology have been categorised as family factors and negative life events, together with individual genetic, cognitive and personal competence factors. Although the significance of each of these factors has been confirmed by numerous studies, it is also evident that further research is necessary to understand their complex interactions and clarify their roles in childhood depressive symptomatology and anxiety.

Protective Factors Associated with Depression

In addition to the risk factors, a number of protective factors have been identified which provide buffers against childhood depression. However, research explaining exactly how these protective factors influence wellbeing

is not as developed as that of the risk factors (Roberts, 1999, Tiet et al., 1996). Downey and Coyne (1990) found that quality of parenting, absence of maternal psychopathology, better family functioning, intelligence, better physical health, and highly advanced social skills act as protective factors. Rice and Meyer (1994) identified coping skills and perceived locus of control as well as intelligence in their list of protective factors. In addition, Zubrick et al. (1995) identified family structure, parental income and adult caregiver relationships as protective factors for children's mental health. They acknowledged an interaction between these factors. For example, children with mothers who have been diagnosed as depressed were at a reduced risk of developing depressive symptomatology if they had high intelligence and well developed social skills (Downey & Coyne, 1990). However, further research is needed to better understand how these protective mechanisms and their interactions work, and how they potentially impact on children who are exposed to risk factors.

The identified increase in depressive and anxiety disorders within the community creates high levels of medical, welfare and social costs for both individuals and society as a whole, and although preventative and early intervention efforts can be effective in the treatment of depression and anxiety they depend on the early identification of those at risk (Goodyer et al., 1997; Hannan et al., 2000; Kovacs, 1996; Mitchum, 1991; Puig-Antich et al., 1993; Rice & Meyer, 1994; Roberts, 1999). Roberts (1999) suggested that the risk factors of individual child characteristics, cognitive factors, personal competence, stressful life events and family factors could be used to identify those groups of children who are at high risk of developing

depressive symptomatology. Early identification of these children would allow early intervention strategies to be put in place. The particular risk and protective factors associated with each individual child could be used to select appropriate prevention strategies and programs. Similarly, Manassis and Bradley (1994) proposed a multi-modal approach to intervention using an integrated model incorporating the child's individual factors including temperament, attachment and other influences such as cognitive factors, developmental events, traumatic events and access to support systems.

Early Identification of Family Risk Factors

Roberts (1999) suggested family factors as an important area to investigate as knowledge about the family can facilitate the early identification of those children who are at high risk of developing depressive symptomatology or anxiety. Family risk factors include parental mental health (Downey & Coyne, 1990), parental interaction patterns, marital conflict, attachment (Main, 1996), and general family functioning (Roberts, 1999). Research studies previously highlighted in this review have found that children with high levels of depressive symptomatology and anxiety are more likely to come from families whose interactions are characterised by more conflict, poor parental mental health, more attachment difficulties and greater general family dysfunction. However, the mechanisms by which these abnormal familial interactions increase the risk of children developing depressive symptomatology and anxiety are not yet understood (Birmaher et al., 1996).

Parental absence effects.

Of particular interest to this review is parental absence. This has been linked to elevated levels of family and maternal stress, which can in turn impact on the levels of depressive symptomatology and anxiety of children in the family (Jensen et al., 1991a). Children of absent parents report more sadness, anxiety and depressive symptomatology (Foreman, Pike, DuPont, & Lunghi, 2001). Stein et al. (2000) found that depressed children were more likely to describe their families as less supportive and cohesive, and more disengaged. Boss (1986) investigated the pattern of parental absence, and found that intermittent parental absence was less problematic for families than parental absences where there was no predictability.

Military families research.

In many cases parents are required to be absent from home due to employment related factors. Much of the research into parental employment absence effects during the latter half of the twentieth century has been conducted on American military families (Jensen, Grogan, Xenadis, & Bain, 1989; Jensen et al., 1991a; Jensen, Xenadis, Wolf, & Bain, 1991b; Jensen, Watanbe, Richters, Corte, Roper, & Lui, 1995). This research stemmed from concern about a presumed prevalence of psychopathology in children from military families, where estimates ranged from one percent to thirty-five percent (Jensen et al., 1991a). Results from earlier studies suggested the presence of a "military family syndrome" characterised by families with depressed mothers, children with emotional and behavioural problems and authoritarian fathers (LaGrone, 1978). However, Jensen et al. (1991a), and Jensen et al. (1995) suggested that these findings might be questionable

because they were guided by "nonempirical notions and prejudices" and by the then lack of availability of well-standardized instruments. Many of the studies focussed on whether their particular sample of military children was different from clinical norms or normative data, rather than using control groups for comparisons.

During the last two decades new tools have been developed which allow more precise screening for the prevalence of psychopathology, including anxiety and depressive disorders. Current diagnostic techniques include multistage, multi-method assessments. These methods have been documented as valid, efficient approaches to determining the prevalence of child psychopathology in community settings (Jensen et al., 1995).

A further risk factor in addition to the pattern and length of parental absence, is concern about the safety of the absent parent. Studies of military families again provide the basis of present understandings of the influence of this factor on children's depressive symptomatology and anxiety. Jensen, Martin and Watanabe (1996), in their study of children of military personnel deployed during Operation Desert Storm, found that active deployment was related to a modest increase in children's self-reported depressive symptomatology, as well as in their parents, when compared with families of non-deployed personnel. However the scores were below clinical cut-offs. The higher symptom levels were also associated with greater levels of family stress, and male and younger children appeared to be most vulnerable. These findings are also supported by Kelley (1994) who reported that depressive symptomatology in children whose fathers were deployed in the

Persian Gulf War was significantly higher than that of children of non-deployed military personnel.

Research from related industries.

There are a number of other industries that also require their employees to be absent from their homes on a regular basis and require their personnel to engage in work practices which may be potentially dangerous or have a greater level of associated risk. These include the merchant marine, deep-sea fishing, forestry, construction, transportation and the mining and petroleum industries (International Labour Office, 1995). Findings from studies into the merchant marine generally provide support for those findings from the military studies. Children of Israeli and Norwegian merchant seamen reported feelings of sadness and depression associated with concern for their father's safety. These children's mothers reported behaviour problems, nervousness and lack of self-restraint amongst their children (Arnold,1995; Rosenfeld, Rosenstein & Raab, 1973). Sutherland and Flin's (1989) review of research into the fishing industry also reported comparable family effects. However, of particular importance to Australia is the mining and petroleum industry which during 1998 - 1999 employed more than 80,000 people directly and 325,000 people indirectly (Australian Bureau of Statistics, 2000).

Parental Absence in the Australian Mining Industry

History of fly-in/fly-out mining practices.

The imbalance between the geographical location of the Australian population and that of Australia's natural resources has always posed a problem for the mining and petroleum industry (Storey & Shrimpton, 1991a). Traditionally the resource sector resolved this issue by constructing mining

towns near or at the resource or processing plant. More recently, changes in the structure of the mining industry, together with financing considerations and changes in the attitudes and aspirations of the mining workforce, have caused the long distance commute, more commonly known as fly-in/fly-out (FIFO), to emerge. FIFO has been used by the offshore oil industry since the 1940s but has only become common in the Australian mining industry since the 1980s (Gillies, Wu, & Jones, 1997; Limerick, Crane, Roberts & Bailiie, 1991). An industry accepted definition of FIFO is "all employment in which the work is so isolated from the workers' homes that food and accommodation are provided for them at the work site, and schedules are established whereby employees spend a fixed number of days at the site, followed by a fixed number of days at home." (Storey & Shrimpton, 1989, p. 2). The employees are usually from a home base located in a large city, coastal community or large established mining town (Gillies et al., 1997). Rotation rosters can vary from 4 days on (on site at the mine) and 3 days off (at home), (4/3), to 13 weeks on and 4 weeks off (91/28), and combinations in between.

Pressures by government and the investment community encourage FIFO and ensure that it will continue to be a major feature of the Australian mining industry in the future (Maxwell, 1999). Indeed, no new mining towns have been built in Australia since the completion of the township of Roxby Downs in the late 1980s to service the Olympic Dam mine (Australian Bureau of Statistics, 2000). Some previous mining towns, for example Telfer in Western Australia, have been converted from residential towns of families to FIFO camps. More than ninety percent of the current Australian FIFO

operations are located in Western Australia (Australian Bureau of Statistics, 2000).

Cost/benefit analyses indicate that the economic benefits of FIFO far outweigh the costs (Jackson, 1987, Limerick et al., 1991). However, the nature of a FIFO lifestyle presents many issues for employers, and employees and their families alike. Only limited research has been conducted investigating these issues, and while the existence of associated psychosocial problems is acknowledged, Australian research to date has mainly consisted of questionnaires presented from the employer's point of view (Arnold, 1995). Some common findings from these studies indicate that FIFO is problematic to some degree for all workers and highly problematic for some (Storey & Shrimpton, 1989). Problems from the employee's point of view include stress associated with regular partings and reunions, length of roster cycle, maintaining ongoing relationships, social isolation, difficulties with role definition, and air safety considerations (Anderson, 1992; Clarke, McCann, Morrice, & Taylor, 1985; John, 1991; Shrimpton & Storey, 1991; Storey & Shrimpton, 1991a). Other findings suggest that in spite of "hating" the lifestyle many employees continue in FIFO trapped by the "golden handcuff" syndrome, that is, wanting to have the lifestyle made possible by the lucrative FIFO rates of pay, but hating the job and being away from home (Adams, 1991; Gillies et al., 1997). In contrast, Jackson (1987) asserted in his article on the impact of a FIFO lifestyle in Australia that the family lives of workers have been greatly improved under commuting. He did not however support this statement with evidence, empirical or otherwise.

These findings, although limited, do have implications for the mental and physical health of employees. Coupled with these employee effects are the impacts FIFO has on the partner and children left at home. If these impacts are mainly negative, and the partner does not cope well there are serious implications for the partner, the children, the employee and the company alike. Home problems have reciprocal effects in the workplace as employees constantly worrying about issues at home resulting from FIFO affect staff morale, production and safety. A better understanding of the impact on partners and children and the ways in which they cope would enable employers to instigate strategies in an effort to overcome some of the negative impacts.

British, Canadian and Norwegian mining and oil families research.

There have been few studies into the psychosocial impacts of a FIFO lifestyle on those family members left at home, and in particular, investigating Australian FIFO families (Arnold, 1995). Our present understandings mainly come from studies of the British, Canadian and Norwegian offshore oil workers and their families, together with Canadian mining families. However, these studies focus particularly on the partners of FIFO employees and do not include the perspective of the children of FIFO employees.

Morrice and Taylor, (1978) and Morrice, Taylor, Clark and McCann (1985), in their comparisons of families of both offshore and onshore North Sea oil rig workers, found no differences in measures of general health of the wives or partners of workers, but found that the strain of swiftly recurring partings and reunions was reflected in more symptoms of depression and anxiety while the husband or partner was away. These effects were greatest

for younger, newly married wives who had children under school age, whose husband's pattern of absence was irregular and of longer duration and who had been in the lifestyle for less than two years. Such findings were repeated with the wives or partners of workers in the Newfoundland and Norwegian oilfields (Solheim, 1988; Story, Lewis, Shrimpton & Clark, 1988). These studies demonstrated that the "at home partner", usually wife, reported feeling sadness prior to and at departure, together with loneliness and anxiety during the absence and prior to their husbands' or partner's return (Clarke et al., 1985; Morrice et al., 1985). Story, Lewis, Shrimpton and Clarke (1988) found that the negative feelings of wives of Canadian oil workers were characterised by unhappiness with the amount of time available to be with their husbands, disruption to their social life and other activities and dislike of enforced independence and solo decision making. In their comparative study of Canadian mining employees and their partners, Storey and Shrimpton (1989) reported that the work pattern was problematic in some ways for virtually everyone involved. The "at home" partners found childcare, role transitions and communication difficult. Thirty-five percent of these mothers reported their children to be more difficult while the children's father was away and fifteen percent reported more difficulties while he was at home.

Recent research from Scottish oil families.

More recently, in their three year study of the interrelationships between children, family, work and community in the oil and gas industry in Scotland, Mauthner, MacLean and McKee (2000) attempted to address the gap in current knowledge of children's perspectives of the work-family

relationship. They interviewed 33 families who had at least one parent employed in the oil and gas industry and at least one child aged from eight to twelve years. Of these families, 23 were involved in onshore work and 10 were offshore, FIFO families. The children were seen at school in focus groups, and families participated in follow-up interviews at home. While the study covered many diverse aspects of work and family life, of particular interest to this review are the children's accounts of the effects of parental work and absence.

The children reported missing their parents to varying degrees, and most children wanted to see more of their parents. Those children whose fathers were absent for extended periods described especially missing their fathers. It appeared that regular parental absences were more acceptable to the children than irregular absences. However, even with regular absences the children really missed their fathers and stated that "it changes ourselves from not lonely to lonely" (p. 135). Some reported feeling fed up and found it upsetting when their fathers missed special events such as birthdays. A number talked about not wanting FIFO work that took them away from their families when they grew up. Many of the children talked about their mothers being upset if their fathers did not come home on time, and their mothers not liking "having to do everything" at home. They reported crying a lot if their mother cried a lot – described in the study as a "knock on" effect. Interestingly, those children whose fathers were onshore workers believed that the children of FIFO workers got to see more of their fathers. That is, the children of onshore workers did not think that offshore fathers necessarily spent less time with their families. The children spontaneously talked about

the dangers and risks associated with the offshore oil industry including limbs being lost and falling overboard from oil rigs, and they reported having bad dreams about oil rig accidents such as the Piper Alpha disaster in which 167 oil workers lost their lives (Collinson, 1998).

The data from this study suggest that children were emotionally atuned to their parents' feelings about work and that this directly affected them. These findings have much in common with the issues raised from the research into military families. They can be summarised as concerns for the safety of the absent parent, impacts of the frequency and duration of parental absence, and the effect of maternal coping or lack of coping on the children, all highlighted earlier in this review as significant risk factors for depressive symptomatology and anxiety in children.

Australian mining families research.

There has been little research conducted into the effects of FIFO employment on Australian families and in particular on Australian children. A review by Arnold (1995) found that the results from those studies which have been completed were mainly based on surveys using survey instruments specifically designed for each particular study. There was little evidence of the use of experimental or quasi-experimental design, control groups or standardised or normed instruments. As such, the findings of the research that is available have limited generalisability.

Findings from a study by Pollard (1990) on three small scale Western Australian mines were consistent with those of the Canadian mines and oilfields, and the North sea oilfields with the "at home" partners highlighting the strain of the periodic departures and arrivals. The Australian personnel

also indicated the advantages of relatively high earnings, of the families' continued access to services, facilities, friends and extended family as well as longer periods of leisure. Gillies, et al. (1997), surveyed fifteen Australian FIFO operations during 1996. A total of 227 FIFO employees completed the questionnaire. Approximately 30% of the respondents indicated that their family categorically did not like the FIFO lifestyle. Furthermore, 25% felt that their immediate family relationships had been seriously disadvantaged by the FIFO employment. This study, however, did not survey the employees' family members. Jackson (1987), in his discussion of FIFO in Australia asserted that the "family lives of workers have been greatly improved" and that " the family's satisfaction with the wage earner's job seems to be radically improved" (p. 164). Unfortunately Jackson did not provide any evidence in support of these assertions.

Adler (1988) provided a single case study of a Melbourne based family of an oil rig fitter working a 4 weeks away/4 weeks home roster offshore from Malaysia. Of the three children in the family, the oldest boy exhibited behavioural problems that became worse in the week before the father's return and the week after his departure. The mother was anxious and had been clinically depressed. She seemed overwhelmed by the children, and was very lonely when the father was away. The family experienced substantial marriage difficulties which appeared to be exacerbated by the FIFO lifestyle. Adler acknowledged that lack of research made it difficult to understand the long term and short term effects of regular, short-term parental absence on children.

In summary, the majority of FIFO research focuses mainly on the Canadian mining and oilfield, and North Sea oilfield personnel and their partners. It demonstrates that most families experience some difficulties with the commute lifestyle, but it appears that the degree to which they cope is dependent on individual factors. There is evidence of some degree of self-selection within these communities. That is, many people who realise they would not cope with the lifestyle never apply to work in such an environment and others terminate their employment as quickly as possible when they find it unsatisfactory. Unfortunately these people have not to date been part of any FIFO research. Those who remain are those who adjust, adapt or learn to cope with the lifestyle (International Labour Office, 1995). While the research identifies both advantages and disadvantages, Storey and Shrimpton (1991b) summarised the main difficulties for FIFO families as the stress and tension of regular partings and reunions, difficulties of parental role definitions and transitions, and problems of spousal absence.

These studies also demonstrate the paucity of research into the psychosocial impacts of a FIFO lifestyle on children, and in particular on Australian children of FIFO employees. In resource rich Western Australia many Perth based families will continue to experience the impacts of regular parental absence through FIFO employment. The state currently has 38 FIFO mining operations (Department of Minerals and Energy, 2001a). In addition, an unspecified number of mining personnel use Western Australia as a family base from which to FIFO to offshore mining operations in, for example, Indonesia, the North-West shelf or the countries of Africa (Department of Minerals and Energy, 2001a). It is important then to

determine whether the risk factors associated with a FIFO lifestyle impact on FIFO children's levels of depressive symptomatology and anxiety. Although children cannot always be protected from risk factors such as family stress and negative life events, with early recognition and intervention they can be provided with skills to help them cope with such events (Hannan et al., 2000; Roberts, 1999).

Comparison of Mining and Military Families

In the absence of published research on the psychosocial impacts of FIFO on children of mining families, and with the common risk factors of frequent parental absence associated with hazardous conditions for military and FIFO mining families, it is appropriate to use the findings from the military family studies as a starting point from which to hypothesise about the impact of these risk factors on the level of depressive symptomatology and anxiety of FIFO children. However, it is also necessary to highlight further similarities and differences between the two groups which may interact with these factors.

Employment stability.

Both mining and military families have relatively stable employment with reasonable levels of income. Mining families, however, can be seen as being a little more at risk for long-term stability of employment because of fluctuations in resource prices. When prices drop some economically marginal operations may close down, often at short notice and jobs are lost. This is illustrated by a fall of eleven percent in employment in the Western Australian gold sector during 2000, mainly a result from a lower gold price

(Department of Minerals and Energy, 2001b), whereas military employment is more likely to be secured by contract.

Social support

Although many mining families do relocate as a condition of employment, military families are subject to greater mobility as a result of regular postings (Foreman et al., 2001). However, they also have greater psychosocial support available to them. They tend to live close together often forming close-knit communities, and have professional support available to them from the defence community organisations. FIFO mining families, on the other hand tend to live further apart, often isolated from each other in different suburbs or towns. While some mining companies do offer some psychological or social support it has been suggested that there is a culture within the industry of not trusting or accepting company help (Arnold, 1995). In addition, as a result of their residential mobility, both mining and military families are often isolated from their extended families and the associated family support structures.

Frequency and duration of parental absence.

Both FIFO and military children experience frequent parental absence however, there are differences between the length and frequency of the parental absences experienced by both groups. Military absences are usually longer and less regular, whereas mining rosters are very regular and of shorter duration. While recent findings from military family research discount the existence of a "military family syndrome" they do provide evidence of higher levels of stress within some of these families especially during the deployment cycle (Eastman, Archer, & Ball, 1990). In particular, a recent

Western Australian study of military families found elevated levels of distress in children when their fathers were absent from home for less than one month or more than five months (Foreman et al., 2001). This has implications for the children from FIFO families as the most common FIFO rosters involve absences of less than one month, and the most common roster at present is 2 weeks away and 1 week home (Gillies et al., 1997). The constant partings and reunions of FIFO may impact on children differently than do the longer but much less frequent absences experienced by the military.

Safety concerns.

In addition to frequent parental absence, FIFO and military families also share the associated hazardous employment conditions, a potential source of family stress (Arnold, 1995; Eastman, et al., 1990). Previous military family research has differentiated the effects of father absence under routine peacetime conditions and absence during deployment for combat or peacekeeping missions. These studies have highlighted the particular stresses associated with safety concerns during deployment. However, this differentiation may be unwarranted as there are elevated levels of risk of personal injury for military personnel during both deployment and peacetime military training. This was evidenced by the Black Hawk Training Accident in 1996 when 18 Australian Servicemen were killed and 12 injured (McLachlan, 1997), and in 1998 when four naval personnel were killed and a number of others injured during a fire aboard HMAS Westralia (Royal Australian Navy, 1999).

A similar, ever-present element of risk inherent in the mining industry is demonstrated by the incidence and frequency of injuries in mining

operations. During 1999/2000 these factors increased by eight percent and three percent respectively in surface mining, and by thirty-five percent and thirty-one percent respectively in the underground sector (Department of Minerals and Energy, 2001b). In the same period there were 583 lost time injuries for a total Western Australian mining workforce of 38,804, and 6 on site mining fatalities (Department of Minerals and Energy, 2001c), 3 of which occurred simultaneously at the Bronzewing mine in June, 2000 (Pratley, 2001). This trend continued in 2000/2001 with the loss of 7 mining personnel together with the pilot enroute to a Western Australian minesite in September, 2000, (Australian Broadcasting Commission, 2000), and a further 4 on-site fatalities to June, 30 2001 (McCulloch, 2001). Journeys to and from the mine site, as well as the time on site, are hazardous for FIFO employees. The Australasian Institute of Mining and Metallurgy, the peak body representing professionals in the Australian mining industry, considers "that the number of fatalities and serious injuries occurring in the mining and metallurgical industries is unacceptable by current community standards" (Australasian Institute of Mining and Metallurgy, 2001) and states that significant hazards exist in the mining and metallurgical industries compared with most other business.

To date there has been no research specifically investigating the impact the perception of the hazardous nature of the FIFO parent's employment has on the family at home, and in particular as a risk factor for increased levels of depressive symptomatology and anxiety in FIFO children. In terms of risk factors the FIFO hazards can be regarded both as ongoing negative life events and family stressors. Goodyer et al. (1988) found

evidence that chronic life stresses exert a significant effect on the psychological well being of children and therefore it can be expected that FIFO hazards are likely to influence FIFO children's anxiety and depression.

Family functioning and maternal behaviour.

Military family research suggests that regular parental absence can impact on the quality of family functioning. It also provides evidence that the effect of these regular disruptions to family routines on the children may be mediated by the mother's attitudes, functioning and coping strategies (Eastman et al., 1990; Jensen et al., 1989; Jensen et al., 1991a; Jensen et al., 1991b; Jensen et al., 1995; Pedersen, 1963). Some partners reported increased anxiety, emotional withdrawal and disruptions in parenting behaviour during their military partner's deployment (Amen, Jellen, Merves & Lee, 1988; Jensen et al., 1989; Kelley, Herzog-Simmer & Harris, 1994). In her review of the literature, Kelley (1994) reported that deployment separation of navy husbands from their wives was accompanied by a cyclic pattern of depressive behaviour during which some mothers also withdrew emotionally from their children. These behaviours and attitudes can impact on family function and cohesion, and consequently on the children's psychological well-being. Kelley's review of longitudinal military studies identified the mother's attitude to the separation, marital satisfaction prior to the separation and the mother's ability to cope with the separation as the three main factors which seemed to account for a child's adjustment to the father's absence.

A study of 785 Navy families by Eastman et al. (1990) found a strong association between family functioning and life stress. Those families who

reported greater life stress also reported lower levels of family function. Jensen et al. (1989) found a significant relationship between military children's self-reports of anxiety and depressive symptomatology and their fathers' absence. However, these effects were no longer evident when maternal stress was controlled. Similarly Jensen et al. (1995), in a two-stage community study of mental disorder in military children and adults, found that only the mothers' depression scores differentiated diagnosed and non-diagnosed children.

These studies support the many non-military studies which provide evidence of the association between maternal behaviour, dysfunction in the family and the well-being of children. Downey and Coyne (1990) reported in their review of the literature that increased maternal stress can lead to greater maternal hostility and irritability, less interaction with children and less effective parenting. Goodyer et al. (1988) also confirmed maternal depression as a risk factor for psychological disorders in children. However, they suggested that the impact of stressful life events and maternal stresses on children's psychological well-being may be the result of complex interactions between the factors rather than simple single impacts. Jensen et al. (1991b) suggested that the evaluation of children who have psychopathological symptoms which appear to be the result of life stressors, should also determine the extent to which the effect of these same stresses on the parents may mediate the children's symptoms.

Studies of the Canadian and North Sea offshore oil employees and Canadian FIFO mine workers provide evidence that the at home partners of FIFO employees also experienced varying degrees of coping with the

stressors of the lifestyle with some adopting more positive attitudes than others (Clarke et al., 1985; Morrice & Taylor, 1978; Morrice et al., 1985; Shrimpton & Storey, 1991; Solheim, 1988; Storey & Shrimpton, 1989). This is turn impacted on the psychological well-being of FIFO children.

This comparison of the risk factors experienced by military and FIFO families has demonstrated that although they share the common risk factors of regular parental absence, concerns about employment conditions, family disruption and social support issues, there are some industry related differences between these factors for each group. These differences include the regularity and duration of parental absences, as well as the types of safety issues and availability of social support.

The Present Study

From this review of the literature it can be concluded that the children of FIFO families have the potential to be chronically exposed to a number of risk factors associated with childhood depressive symptomatology and anxiety. The particular risk factors relate to stressful life events and family factors. Specifically, these risk factors are frequent parental absence associated with hazardous conditions, together with disruption to family routines. The absence of any relevant research in this area highlights the need to assess whether the exposure to these risk factors is associated with any increase in depressive symptomatology or anxiety in FIFO children. Early recognition would allow early intervention and preventative strategies to be implemented.

The purpose of the present study then was to provide a preliminary investigation into the effects of a FIFO lifestyle on primary school aged

children's psychosocial well-being as assessed using self-report measures of anxiety and depressive symptomatology. There is some debate about the accuracy of self reported anxiety and depressive symptomatology, with evidence that children may underreport their symptoms in a desire to perhaps avoid treatment or as a result of the individual child's coping strategies (Downey & Coyne, 1990; Manassis, Tannock, Mendlowitz, Laslo, & Masellis, 1997). Conversely there are suggestions that children's self reports of the symptoms may be more accurate than those of their parents or teachers because depression and anxiety are internalising behaviours and the symptoms may only be noticeable to the children themselves (Jensen et al., 1989). Nevertheless, for the purposes of this preliminary study, and to remain consistent with recent military family studies (Foreman et al., 2001; Jensen et al., 1995; Jensen et al., 1996), self report measures were deemed satisfactory.

The absence of any known research particular to FIFO children precluded a hypothesis, however, a number of research questions were formulated. By directly comparing children and mothers from FIFO families with mothers and children from non-FIFO families, this exploratory study aimed to determine firstly whether primary school aged children from FIFO families had significantly higher levels of depressive symptomatology and anxiety than primary school aged children from non-FIFO families. Secondly it aimed to determine whether primary school aged children and mothers from FIFO families perceived significantly higher levels of family dysfunction than primary school aged children and mothers from non-FIFO families.

In the light of the literature review, a third issue to be investigated was the relationship between depressive symptomatology and other variables such as childhood anxiety and family functioning. The literature review indicated that a relationship exists between these variables and as a consequence it was proposed that the level of depressive symptomatology would be associated with childhood anxiety and measures of family function. In particular, higher levels of depressive symptomatology would be evident in those children who had higher levels of anxiety and perceived more family distress.

Finally this study sought to determine the relationship between FIFO children's depressive symptomatology and the duration of parental absence. The review of research on military families indicated that there is a relationship between these two variables. As a consequence, it was proposed that level of depressive symptomatology in FIFO children would be associated with the length of time their fathers were absent.

Method

Design

This study was a quasi-experimental between subjects design using two naturally occurring groups of children and their mothers. The groups were matched on age and gender. Both groups completed a series of questionnaires to allow comparison of the children's levels of anxiety and depressive symptomatology together with their perceptions of family function. The mothers' perceptions of family function were compared and analysed to determine their impact on the children's levels of depression.

Participants

Members of the experimental (FIFO) group were 30 children from years four to seven, together with their mothers who were selected on the basis of the father's employment necessitating a FIFO lifestyle for the family. A control group (Control) of 30 children whose fathers did not have FIFO employment, and their mothers, was also selected. Of these, 23 children came from families whose children attended Peter Moyes Anglican Community School, Mindarie, and John Septimus Roe Anglican Community School, Mirrabooka. In order to fully match the FIFO and Control groups a further 7 female participants in the Control group were obtained from archival data. None of the fathers of the Control group worked away from home on a regular basis, or had been absent from home for a total of more than one month in the previous year.

The groups were matched according to children's age and gender to control for the effects of these variables, both of which are associated with anxiety and depressive symptomatology (Cole et al., 1998; Zubrick et al.,

1995). The children's ages ranged from 8 to 12 years with an overall mean age of *M* = 10.15 years, *SD* = 1.29 years. There were 26 males (*M* = 10.23 years, *SD* = 1.39 years) and 34 females (*M* = 10.09 years, *SD* = 1.22 years).

Socio-economic status has been identified as a factor associated with anxiety and depressive symptomatology (Zubrick et al., 1995). The medium fee Anglican community schools were initially chosen as catchment for the Control group in an endeavour to have a similar socio-economic status for both the FIFO and the Control groups. It was reasoned that FIFO employees are on "reasonable" incomes and that only those families with a "reasonable" income could afford to enrol their children at the schools as neither school had a scholarship programme at the time. The 7 female participants obtained from archival data attended Swanbourne Primary School, a Perth northern suburbs coastal school.

The majority of participants in the FIFO group lived in Perth's northern suburbs. There was one family located further north at Gingin, one in the eastern goldfields, two from Perth's southern suburbs and three from the South West of Western Australia. The Control group families were all from Perth's northern suburbs.

Family types.

The distribution of the different family types in both the FIFO and Control groups is shown in Table 1. A "nuclear family" consisted of the biological mother, father and their child/children. A "single family" was the mother and child/children only, while a "blended family" had a mother and father together with children from their current relationship or from previous relationships. The final category of "other type of family" included those

families who did not fit in any of the other groups, and in this study included one FIFO family made up of parents and three long term foster children.

Table 1

Percentages of Family Types for FIFO and Control Groups

	FIFO Group		Control Group	
Family Type	Frequency	%	Frequency	%
Single parent family			1	3.3
Nuclear family	24	80.0	27	90.0
Blended family	4	13.3		
Other family	2	6.7	2	6.7

Note. n = 30 for each group.

The FIFO families.

The mean years of FIFO employment was M = 5.96 years, SD = 4.17 years, with a range from .30 to 13 years. 36.7% of families had the most common roster cycle of 9 days away/5 days home, and 20% had the next most common roster of 2 weeks away/2 weeks home. The most commonly preferred roster cycles were 2 weeks away/1 week home, 9 days away/5 days home and 2 weeks away/2 weeks home, each of which were preferred by 16% of the mothers. A total of 23.3% of mothers preferred their partner's current roster, 53.4% indicated that they would prefer a different roster and 23.3% indicated they would prefer not to be involved in a FIFO lifestyle at all.

Measures

A number of psychometric instruments were completed by the children and their mothers. The details of these instruments are highlighted below.

Children's Depression Inventory (CDI) (Kovacs, 1992).

The CDI is a 27 item self-report questionnaire which assesses depressive symptomatology in children and adolescents between 6 and 17 years of age. For each item participants selected which of the three options best described the way they had been feeling recently. The three response items were scored as 0, 1 or 2 and the item scores are summed to make a total score which can range from 0 to 54. The suicide item, Item 9 was not included in the present study because of concerns expressed by the school administration, thus restricting the range for the present study to 0 to 52. The total score is most frequently cited in research, and higher scores are indicative of the presence of depressive symptomatology. Current research on the CDI suggests that a score of 13 represents moderate levels of depressive symptomatology, and that a score of 19 can be used as an indication of clinical depression (Cole et al., 1996). The CDI has acceptable validity and reliability with a reported internal validity of between .71 and .89 and a two week test-retest reliability of .82 (Kovacs, 1992). For the present study Cronbach's alpha was .78, indicating an acceptable level of internal consistency for the 26 item instrument for research purposes (See Appendix A for examples of CDI items).

Family Assessment Device (FAD) (Epstein, Baldwin & Bishop, 1983).

The FAD is a 60 item self-report questionnaire designed to evaluate families according to the McMaster Model of Family Functioning. The FAD

consists of seven sub-scales which measure the following; problem solving (PS), communication (CO), roles (RO), affective responsiveness (AF), affective involvement (AI), behaviour control (BC) and general functioning (GF). Successful performance on each of these subscales is required for families to function in an effective and healthy manner. Problem solving measures the family's ability to solve problems at a level which maintains effective family functioning. Communication refers to the degree of clear and open communication within the family. Roles addresses those specific behaviours which family members must perform for successful everyday living. Affective responsiveness assesses the degree to which family members reveal their feelings to each other, and affective involvement describes the readiness of family members to help or support each other. Behaviour control refers to the standards and norms that govern family member's behaviour and their emergency procedures. Finally, general family function is an overall measure of the family's health and pathology (Byles, Byrne, Boyle, & Offord, 1988). Each item on the FAD is included in only one of the seven scales.

Responses to each item were made on a 4 point rating scale which ranges from "strongly agree" to "strongly disagree". For each of the sub-scales the item scores were totalled and then divided by the number of items belonging to the particular sub-scale. Higher scores are indicative of greater family dysfunction. The recommended cut-off scores for unhealthy family functioning on each sub-scale are as follows; Problem Solving, 2.2, Communication, 2.2, Roles 2.3, Affective Responsiveness, 2.2, Affective

Involvement, 2.1, Behaviour Control, 1.9 and General Functioning, 2.0 (Miller, Epstein, Bishop, & Keitner, 1985).

Only the 12 item General Functioning Scale from the FAD was used with the children in this study. This scale is designed to correlate highly with the other FAD scales and the items reflect aspects of the other six dimensions. Its assessment of cohesiveness and interaction between family members adequately summarises family function (Ridenour, Daley, & Reich, 1999). The mothers completed the full 60 items of the FAD. The FAD has acceptable levels of validity and reliability with reported internal consistency of between .72 and.92, and one week test-retest reliability of between .66 and .76 (Epstein et al., 1983; Halvorsen, 1991). One week test-retest reliability for the sub-scales were: Problem Solving .66, Communication .72. Roles .75, Affective Responsiveness .76, Affective Involvement .67, Behaviour Control .73, and General Functioning .71 (Byles et al., 1988). Cronbach's alpha for the sub-scales in the present study were: Problem Solving .70, Communication .81, Roles .81, Affective Responsiveness .73, Affective Involvement .81, Behaviour Control .67, and General Functioning (mothers).90, and General Functioning (children) .80, indicating an acceptable level of reliability for research purposes. (See Appendix A for examples of FAD items for each of the sub-scales).

Revised Children's Manifest Anxiety Scale (RCMAS) (Reynolds & Richmond, 2000).

The RCMAS is a 37 item self-report inventory which measures the presence of anxiety in adolescents and children between 6 and 19 years of age. It employs a total of 28 items to measure anxiety on three correlated

dimensions; worry/oversensitivity, physiological symptoms and inattentiveness. Together these dimensions are summed to produce a total Anxiety score. This total Anxiety score is most widely used for research purposes. The remaining 9 items measure social desirability and are totalled to produce the Lie score. Scores from the Lie Scale are not included in the total Anxiety score.

The RCMAS is suitable for group or individual administration. Participants marked either "yes" or "no" to indicate whether each item was true or not true for them. The responses were scored as 0 or 1 and the item scores were summed to make a total score ranging from 0 to 28. Higher scores are indicative of greater levels of anxiety. A total Anxiety score greater than 12.27 represents levels of anxiety which interfere with everyday functioning (Reynolds, & Richmond, 2000).

The RCMAS has good reported reliability and validity, and internal consistency of .80 (Dadds, Perrin & Yule, 1998, Reynolds & Richmond, 2000). In the present study Cronbach's alpha was .85 (See Appendix A for examples of RCMAS items).

Family Information Sheet (FIS).

The children's mothers also completed a brief demographic questionnaire (FIS). In this questionnaire mothers were asked to provide the type and length of current employment for both parents, as well as details of employment related absences for both parents. In addition, FIFO families were asked to provide information about their FIFO roster, their preferred roster and the length of time the family has been involved in FIFO (See Appendix A).

Procedure

The Managing Directors of Homestake Mining, Australia and Sir Samuel Mines N.L., together with the Principals of Peter Moyes Anglican Community School, and John Septimus Roe Anglican Community School were initially contacted by letter and subsequently agreed to allow potential participants to be approached through their companies and schools.

The 350 employees of Homestake Mining and Sir Samuel Mines N.L. who worked in a FIFO capacity received through their personnel department; an information package containing a covering letter from the relevant company's management, an information letter and invitation to participate in the study, an informed consent form and a reply-paid, addressed envelope. Ethical considerations of voluntary participation, data management and confidentiality were addressed in the letters of introduction and the consent forms (see Appendix B for a copy of the letters and the consent form).

Participants were requested to return the signed consent form to the researcher by post by a specified date. A total 25 replies were received, which corresponds to a return rate of 7 percent. Of these replies 5 did not fit the criteria to be included in the present study. However, when contacted, they all expressed interest in participating in any future FIFO research. Although the response rate initially appeared to be unusually low, discussion with the mining companies revealed that all FIFO personnel had been provided with an invitation to participate package because their personnel records did not contain enough detail to determine which employees fitted the study criteria of having a partner as well as children in years 4 to 7 at primary school. The management of both companies stated that they

believed more of their employees were single or childless, but they could not provide actual percentages. Furthermore, to protect the privacy of the mine employees, the packages were delivered to the personnel when they were on site. It is possible that some employees did not take the packages home and allow their partners the opportunity to decide whether or not to participate. A follow-up letter was sent to the mine sites. A further 10 FIFO participants were recruited using snowballing techniques.

FIFO group mothers were contacted by phone, and a time and place was arranged to administer the surveys. All FIFO families chose to complete the questionnaires at their homes. The researcher visited the FIFO homes and administered a CDI, FAD and RCMAS to the children while their mothers completed a FAD and a FIS. Each instrument was administered according to the specific directions in the manuals, and assistance was provided by the researcher as required. Following completion of the survey, participants were debriefed and thanked by the researcher. This included answering any relevant questions from the participants as well as providing an opportunity for participants to express any thoughts or feelings about the experience. Themes resulting these discussions with FIFO mothers were noted. The contact details of those FIFO mothers who expressed interested in participating in future FIFO research were recorded.

Families of years 4, 5, 6 and 7 students at Peter Moyes Anglican Community School and John Septimus Roe Anglican Community School received, through the school, the following research package; an information package with a covering letter from the school Principal, an information letter and invitation to participate in the study, an informed consent form, a parent

FAD, a school FIS and a pre-paid addressed envelope (see Appendix C for copies of the letters and consent form). Parents were also informed about the study through the school newsletter. The signed consent forms together with the completed Family Information Sheet and the FAD were returned to the researcher either by post, or by being placed in a labelled box in the school's administration area, by a specified date.

The CDI, FAD and RCMAS for the Control group children were administered in group settings at the schools, in rooms set aside for the purpose, at times that were mutually convenient for the schools and the researcher. The surveys were administered by the researcher according to the specific directions in the manual for each measure. The children completed each of the surveys at their own pace, and assistance was provided to any child who had difficulties completing any part of the questionnaires. Following completion of the questionnaires the children were debriefed and thanked by the researcher, and returned to their classrooms.

The CDI and RCMAS were scored to identify any children displaying high levels of anxiety or depressive symptomatology. As had been previously agreed upon, either the school or parents of children with high scores were contacted to allow further evaluation to be undertaken.

Results

Data Screening

Prior to analyses, demographic data, and scores on the CDI, RCMAS, and FAD were examined through various SSPS, Version 10 programmes for accuracy of data entry, missing values and fit between their distributions and the assumptions of univariate and multivariate analysis. The variables were examined separately in both grouped and ungrouped conditions. Two univariate outliers were identified. One case from FIFO group CDI data and one case from the FIFO group mother's scores from the FAD general functioning sub-scale (MGF) were identified as outliers because of their extreme *Z* scores. These cases were retained in the data set. It was reasoned that these cases were from the intended population because the distribution of the variables in this population had more extreme cases than a normal distribution, that is, there appeared to be a wider scatter of scores in the FIFO group and therefore these extreme scores were acceptable (Tabachnick & Fidell, 1996).

Group Comparisons

Mean scores obtained by FIFO and Control groups on each instrument are shown in Table 2.

Table 2

Means and Standard Deviations of FIFO and Control Group Responses to CDI, RCMAS, MFAD and CFAD

	Group			
	FIFO		Control	
Instrument	M	SD	M	SD
CDI[a]	7.60	5.76	5.00	3.66
RCMAS[b]	11.00	6.76	8.17	6.07
CGF[c]	1.87	.42	1.82	.38
MGF[c]	1.84	.39	1.56	.36

Note. n = 30 for each group. CGF = Children's scores on General Function scale of FAD. MGF = Mother's scores on General Function Scale of FAD.

[a] Maximum score = 52. [b] Maximum score = 28. [c] Maximum score = 4.

In order to test the research question that the FIFO and Control groups would have significantly different means for each of the research instruments, a series of uni-directional independent groups *t* tests were conducted using a Bonferroni adjusted alpha of .012 to decrease the chance of a Type 1 error.

These analyses showed that the FIFO group mothers had significantly higher scores than the Control group mothers on the General Functioning sub-scale of the FAD (MGF), t (58) = 2.86, $p < .012$. Thus indicating that the

FIFO mothers perceived their families as having less healthy function than the Control families.

However, the independent groups *t* tests comparing the mean scores of the FIFO group with the mean scores of the Control group for the CDI, t (58) = 2.09, $p > .012$, the RCMAS, t (58) = 1.71, $p > .012$, and the CGF t (58) = .48, $p > .012$, indicated that the differences between the two groups were not significant for these measures (see Appendix E)

Influence of anxiety, perceptions of family function, and group on depression

In order to determine the influence of anxiety, children's perceptions of family function, FIFO, and mothers' perceptions of family function on children's depression, a standard multiple regression was performed between CDI as the criterion variable and Group (FIFO and Control), RCMAS, CGF and MGF as the predictor variables. Results of the evaluation of assumptions performed using SPSS Version 10.0 Regression and Frequencies were satisfactory. With the use of a $p < .001$ criterion for Mahalanobis distance no multivariate outliers were found. Table 3 displays the correlations between the variables.

Table 3

Correlations Between CDI, RCMAS, CGF, MGF and Group Variables

Variable	RCMAS	CGF	MGF	Group
CDI	.52**	.35*	.19	-.26*
RCMAS		-.01	.01	-.22*
CGF			.70	-.06
MGF				-.35*

Note. * significantly correlated, $p < .05$. ** significantly correlated, $p < .01$.

Table 4 presents the unstandardised regression coefficients (*B*), the standardised regression coefficients (β), the multiple correlation (*R*), and the squared multiple correlation (R^2) from the regression analysis. The multiple correlations were significantly different from zero, F (4, 55) = 10.28, $p < .001$. The combined scores from the RCMAS, CGF, and MGF together with Group predicted 42.8% of the variance of the CDI scores. However, only RCMAS and CGF made a significant unique contribution to predicting depression. Group and MGF did not contribute significantly to the regression and as such were not significant predictors of CDI.

Table 4

Summary of Standard Multiple Regression of Anxiety, Children's General Functioning, Mother's General functioning and Group on Depression

Variable	*B*	β	
RCMAS	.38**	.50	
CGF	4.20**	.34	
MGF	1.61	.13	
Group	-.86	-.09	
			Intercept -6.57
			R^2 = .43
			Adjusted R^2 = .39
			R = .65**

Note. $^{**}p < .01$.

Altogether, 42.8% of the variability in the depression score was predicted by the anxiety score, the children's perception of family function, mother's perception of family function and FIFO or Control group membership. Of this only anxiety (27.2%) and children's perceptions of family function (12.4%) contributed significantly (see Appendix E).

Impact of roster on depression

In order to determine the impact of the father's length of time away on the FIFO children's depressive symptomatology, the father's rosters were classified into the following categories according to the number of days away and the number of days home; away less than 14 days, away from 14 up to and including 20 days, away 21 days or more. The mean ranks and mean

CDI scores for each of these categories are shown in Table 5. A Kruskal-Wallis Chi-Square approximation was appropriate for this analysis as there were very small and uneven sample sizes together with violation of the assumption of normality. The Kruskal-Wallis Chi-Square approximation, corrected for ties, χ^2 (2, N = 30) = 5.59, p >.05, indicated that the CDI scores were not significantly different across the three groups (see Appendix E).

Table 5

Grouped Rosters' Ranked Means and Group Means for FIFO Group Scores on CDI

Grouped Roster	N	Mean Rank	Mean CDI Score
Away < 14 days	14	18.00	9.21
Away 14 to 20 days	10	10.15	4.10
Away 21 days or more	6	18.58	9.67

FAD sub-scale comparisons

Further analysis was conducted to explore the differences between the mothers' perceptions of family function. A between subjects multivariate analysis of variance (MANOVA) was conducted using both groups' scores on each of the FAD scales of Problem Solving, Communication, Roles, Affective Responsiveness, Affective Involvement, Behaviour Control and General Functioning. The independent variable was group (FIFO or Control) and the dependent variables were each of the FAD sub-scales. Results of evaluation of assumptions of homogeneity of variance-covariance matrices, linearity, and multicollinearity were satisfactory. The Shapiro-Wilk's test of normality

was significant ($p < .05$) for Problem Solving, Communication, Affective Involvement, Behaviour Control and General Function so the assumption of normality was violated for these scales. However MANOVA is robust to assumptions of normality if the cell sizes are equal and there are at least 30 samples as was the case in this analysis (Tabachnick & Fidell, 1996). The results, however, do need to be interpreted with caution. The scales of Problem Solving, Communication, Roles, Affective Responsiveness, Affective Involvement, Behaviour Control and General Functioning were all significantly correlated with each other ($p < .01$, 2 tailed), and therefore MANOVA was appropriate for this analysis. The intercorrelations between the FAD sub-scales are presented in Table 6

Table 6

Intercorrelations Between FAD Sub-scales

	PS	CO	RO	AR	AF	BC	MGF
PS		.57*	.54*	.51*	.41*	.37*	.68*
CO			.67*	.67*	.75*	.56*	.68*
RO				.39*	.74*	.60*	.50*
AR					.58*	.55*	.77*
AF						.63*	.60*
BC							.54*

Note. * = significant correlation, $p < .01$, 2-tailed. PS = problem solving, C = communication, R = roles, AR = affective responsiveness, AF = affective involvement, BC = behaviour control, MGF = general functioning.

With the use of Pillai's Trace criterion the combined dependent variables were significantly effected by Group, $F(7, 52) = 3.00$, $p < .05$, indicating that there was a significant difference between the overall family function of the FIFO and the Control groups. Further examination of the univariate F tests using a Bonferroni adjusted alpha of .007 to decrease the chance of a Type 1 error, revealed significant differences between the FIFO group mothers and the Control group mothers on the Communication, $F(1, 58) = 12.15$, $p < .007$, Affective Responsiveness, $F(1, 58) = 9.92$, $p < .007$, Affective Involvement, $F(1, 58) = 16.92$, $p < .007$, Behaviour Control, $F(1, 58) = 15.79$, $p < .007$, and General Functioning, $F(1, 58) = 8.18$, $p < .007$. There were no significant differences between the FIFO mothers and Control group mothers on Problem Solving, $F(1, 58) = 8.18$, $p < .007$or Roles $F(1, 58) = 8.18$, $p < .007$. The means and standard deviations are shown in Table 7. The FIFO mothers means for Roles, $M = 2.32$, and Affective Involvement, $M = 2.24$, were above the cut off scores for healthy family functioning in these areas signifying unhealthy family function in both of these areas. The scores on Communication, $M = 2.14$, and Behaviour Control were also elevated.

Table 7

Mean FAD Sub-scale Scores for FIFO and Control Group Mothers

	FIFO Group		Control Group	
Scale	*M*	*SD*	*M*	*SD*
Problem Solving	1.89	.33	1.77	.33
Communication**	2.14	.42	1.80	.34
Roles	2.32*	.34	2.05	.41
Affective Response**	1.95	.47	1.61	.37
Affective Involve**	2.24*	.43	1.82	.35
Behaviour Control**	1.85	.24	1.56	.32
General Function**	1.84	.39	1.56	.36

Note. $n = 30$ for each group. ** significant difference, $p < .007$. * above cut-off scores for healthy function.

Themes from Interviews

Either during, or following completion of the survey instruments each of the FIFO mothers instigated discussion about the various aspects of a FIFO lifestyle which were important in their lives at the time. These are reported under the following theme headings.

Attachment.

One mother described the poor relationship between her 7 year old son and his father. She attributed this to a failure of attachment/bonding to develop between the boy and his father because the father's previous roster had necessitated that he be away for the birth and first three months of the child's life.

Communication.

The quality of communication with the away partner was a very important issue for all FIFO mothers. Most employees do not have phones in their rooms and often have to queue up at the public phone box to talk to their families resulting in a lack of privacy when sharing personal or intimate information, thoughts and feelings. One mother suggested that the availability of communication was dependent on the beliefs and values of the mine manager. The number of phone lines available on mine sites is limited and one mother suggested that those men with families should be given priority when the rooms with phones are allocated.

Job Security.

Two mothers felt as though they had been forced into a FIFO lifestyle because of the lack of availability of alternate suitable work with a comparable salary. They had been living interstate in a non-FIFO situation and the mining company had transferred their husbands to Perth to a FIFO situation. They felt they had to agree to the move as their husbands may not have been able to easily find alternate employment.

Relationship Issues.

One mother described that she and her husband were the only couple whose marriage was still intact out of their group of offshore FIFO employees. The others had all separated over the years and many had found new partners who were citizens of the country where the mine was located. The issue of fidelity was also mentioned by three mothers – that the isolation and loneliness of camp life might leave their husbands "open to temptation".

Roles

All mothers talked about the change in family members' roles between when the father was away and when he was home. They described a "forced independence" while their partners were away, and a "forced dependence" when they were home. This also impacted on the children's own roles within the family as well as on how the children saw their parents' roles.

Roster.

Most families preferred shorter rosters or not to be involved in FIFO at all. One family preferred a 4 weeks on/4 weeks off to 2 weeks on/2 weeks off because they felt it gave them more time to adjust and settle in to each cycle. All families mentioned their unhappiness if their partner came home later than the expected date or had to go back early. Some mothers complained that their partners had to work or go into "head office" during the time they were at home. They saw this as diminishing the time the family actually had together, the family time was "stolen" by the company and the father's focus remained on work rather than being at home. This contributed to stress within the families. The days just prior to the father's leaving and those immediately after his return were also common family stressors.

Safety

Those 3 families who were employed in offshore work mentioned concern about the safety of their partner and specifically transport to and from the sites. Another mother was very concerned about the safety of her husband who was to work in Africa at a mine site very close to regional fighting. One onshore mother mentioned the only medical staff on site where her partner

worked was a nurse who also worked in the office and who had no recent emergency nursing experience other than that gained on site.

Social Aspects.

The 6 families who had experienced mining town living as well as FIFO commented on missing the sense of community and social support with FIFO. They especially mentioned feeling a sense of isolation, as though their partner had two separate and distinct lives, one from which they were excluded. Those mothers who had moved to Perth for their partner's employment also commented on the feeling a sense of social isolation, of being remote from family or friends.

Voiceless Families

A total of 8 mothers expressed their relief that some-one, that is the researcher, "was at last interested in what they had to say" and in the issues associated with FIFO. They described themselves as "voiceless" and invisible to the mining companies.

Discussion

This study was an exploratory investigation into the psychosocial well-being of children from fly-in/fly-out mining families. It sought to answer the following research questions; whether primary school aged children from FIFO families had significantly higher levels of depressive symptomatology and anxiety than primary school aged children from non-FIFO families, whether primary school aged children from FIFO families perceived significantly higher levels of family dysfunction than primary school aged children from non-FIFO families, if children's depressive symptomatology was influenced by anxiety, group membership, the children's and mothers' perceptions of family function, if the duration of their fathers' absences was associated with FIFO children's elevated depressive symptoms in FIFO children, and whether there were any differences between FIFO and non-FIFO mothers' perceptions of family function.

FIFO children's depressive symptomatology, anxiety and family function

The results of this study provide evidence that although children from FIFO families had higher levels of depressive symptomatology and anxiety, and perceived higher levels of family dysfunction than children from non-FIFO families, these differences were not statistically significant. In fact, the scores on all measures for both groups were below the norms for healthy functioning, thus indicating that all of the children in the sample had non-clinical levels of depressive symptomatology and anxiety, and perceived that their families were functioning well.

The literature review previously identified a number of risk factors associated with childhood depression (Roberts, 1999). Of these, FIFO

children are exposed to regular parental absence associated with hazardous employment conditions. Exposure to these chronic family stressors could lead to family dysfunction and elevated levels of depressive symptomatology and anxiety. However, this study did not provide any evidence that FIFO related parental absence was associated with high levels of depressive symptomatology, anxiety or perceived levels of family dysfunction for FIFO children. In contrast, the results of this study provide some support for the findings of previous research which suggested that relatively brief parental absences under routine conditions exert minimal effects on children's psychosocial well-being (Boss, 1986; Morrice & Taylor, 1978; Morrice et al., 1985). For this specific group of FIFO children regular father absence did not appear to be a risk factor. Interpretation of the results must take into account the exploratory nature of this study. It would be premature to generalise these findings to other FIFO children as there are a number of FIFO related variables not controlled for in this research which could mediate the influence of a FIFO lifestyle on children' s psychosocial well-being.

The present study accounted for the influence of children's age, gender and socio-economic status. FIFO related variables that need to be investigated in future studies include the age at which children began a FIFO lifestyle. Those children who were born into the lifestyle and have always experienced their fathers' regular absences may cope differently from those children who originally had their fathers at home and were subsequently introduced to FIFO at a later age. Similarly, the impact of FIFO might be influenced by the length of time families have been involved in FIFO employment. There is some evidence of self-selection within the FIFO mining

families (International Labour Office, 1995), suggesting that only those families who are able to cope remain in FIFO employment for any length of time. Those who remain are families who have adjusted, adapted or learned to cope with the lifestyle. Furthermore, the particular stage in the father's roster cycle may also impact on FIFO children's wellbeing. Previous research reported families feeling different levels of loneliness and anxiety at different times during the roster cycle (Clarke et al., 1985; Morrice et al., 1985). In addition, Storey and Shrimpton (1989) found 35% of mothers had difficulties with their children while the father was absent and 15% when he was at home. Further research could determine the influence of these variables on FIFO children's wellbeing.

The FIFO children's absence of depressive symptomatology and anxiety, together with their perceptions of healthy levels of family function in the present study, could be explained in the terms of the influence and interaction of protective factors in these areas. Zubrick et al. (1995) highlighted the protective factors of family structure and level of family income, stating that children from original nuclear families have a much lower incidence of mental health problems than those from single parent or blended families. In addition, higher family income has been associated with better mental health. Quality of parenting (Downey & Coyne, 1990), and better family functioning (Silburn et al., 1996), can also act as protective factors. The FIFO children were all from two parent families of which 80% were of traditional nuclear structure. Their incomes were regular and in the mid to upper range. The FIFO children in this study perceived that their families were functioning at healthy levels. In addition, it may be that despite the

regular father absence, the FIFO children experience a high quality of parenting as their parents attempt to compensate for the fathers' absences. Also, FIFO mothers may be providing a buffer for their children from the stresses of a FIFO lifestyle. Finally, these children may not perceive their fathers' work as hazardous. The routine nature of the regular comings and goings may have desensitised the children to this effect or the family may "actively ignore" this aspect of the industry. The combination and interaction of these protective factors could indeed be mediating the more negative aspects of a FIFO lifestyle on children. Further investigation of this area could lead to a better understanding and clarification of the role of protective factors in the psychosocial well-being of FIFO children.

Mother's perceptions of family function

In contrast to the findings on the children, this study provides evidence that FIFO mothers perceived significantly higher levels of family dysfunction than did non-FIFO mothers on 5 of the 7 family function sub-scales; namely Communication, Affective Responsiveness, Affective Involvement, Behaviour Control and General Family Function. Of these, the FIFO families had unhealthy levels of function in the areas of Roles and Affective Involvement. The scores on Communication and Behaviour Control were also elevated. In comparison, healthy functioning was indicated for the Control Group on all sub-scales.

These findings reflect the issues highlighted by FIFO mothers during the informal interviews, in particular role definition, communication and rosters. Communication refers to the degree of clear and open communication within the family (Byles et al. 1988). This was raised during

the interviews, and confirmed by the FAD as a significant problem for FIFO families. FIFO employment imposes both physical and emotional constraints on communication between FIFO employees and their families. As indicated by the mothers, problems with communication can be a significant source of family stress. Further research, including both the FIFO employees and their partners, would clarify the particular areas that are of concern, and could recommend appropriate strategies to facilitate better communication.

Affective Involvement describes the amount of interest, care and concern family members invest in each other, and the readiness of families to help or support each other (Byles et al. 1988). This area was also highlighted by the FAD and during the interviews as a significant problem for FIFO families. Regular parental absence imposes physical limitations on the FIFO employee's ability to be able to provide the particular type of help and support described by affective involvement. Thus, it is not surprising that the FIFO mothers in this study perceived that their families were functioning at unhealthy levels in this area.

The Roles sub-scale assessed the degree to which the family members are able to perform those specific behaviours necessary to fulfil the instrumental and affective needs of the family (Byles et al. 1988). Both the FAD and the interviews confirmed that role definition within the family was a significant problem. This research supports earlier findings that family members report having to regularly redefine their roles within the family depending on whether the FIFO parent was absent or home (Anderson, 1992; Clarke, et al., 1985; John, 1991; Storey et al., 1989). Storey et al. (1989) described the wives of Canadian oil workers disliking their "forced

independence" while their husband was away. The FIFO mothers in the present study described their regularly changing roles of "forced independence and dependence". The role at a particular time depended on whether their partner was home or away.

The problems associated with continually changing role definitions within the family may be associated with the elevated scores on the Behaviour Control. This sub-scale defines the family's style of maintaining discipline and standards of behaviour (Byles et al. 1988). If both parents have different values and beliefs about familial behaviour management, the frequently changing roles of the parents within their family settings could lead to inconsistencies and confusion within the family in this area. Such "flow-on" effects throughout the different areas of family function are consistent with the McMaster Model of Family Functioning, a systems based model focusing on the systemic properties of a family rather than on individual family members (Epstein et al., 1983). This model was an appropriate framework to assess the overall impacts of FIFO employment on family function.

As described previously in the literature review, both military and non-military studies have provided evidence of the association between maternal behaviour, attitudes and coping, and dysfunction in families and children (Downey & Coyne, 1990; Goodyer et al.,1988; Jensen et al.,1991a; Jensen et al., 1991b; Kelley, 1994). Detailed investigation of these associations within FIFO families was beyond the scope of this preliminary study. However, the present study's investigation of the association between FIFO mothers' perceptions of family function and children's depressive disorders provided evidence that further investigation is warranted. The General

Functioning sub-scale of the FAD is reported as a reliable overall measure of the family's health and pathology (Byles, et al., 1988). The FIFO mothers in the present study perceived their families had healthy general functioning. However, further analysis of the mothers' responses on each of the FAD sub-scales uncovered that they perceived their families were functioning at less than healthy levels on two sub-scales and had elevated scores on a further two sub-scales. These findings identify the need to further investigate perceptions and behaviour of FIFO mothers. In order to clarify the role of maternal behaviour on the impact of FIFO employment on children and families, it would be appropriate to focus on individual functioning. Measures of individual maternal wellbeing could be obtained using the General Health Questionnaire (Goldberg & Williams, 1985), the Beck Depression Inventory (Beck, Steer, & Brown, 1996) or the Beck Anxiety Inventory (Beck & Steer, 1993).

Interviews

The FIFO mothers in the present study identified issues associated with attachment difficulties, communication, security of employment, maintaining relationships, roles within the family, roster cycles, social aspects and safety. In addition they expressed concern about being "voiceless", that is, no one was interested in their feelings about their FIFO lifestyles. Each of the mothers instigated the discussions themselves. The themes provide some Australian based support for earlier Canadian and Norwegian studies which found the "at home" partners reported communication, role transitions, length of roster, and enforced independence as negative issues associated with FIFO employment (Storey et al., 1988; Storey & Shrimpton, 1989).

Similarly, the issues raised by the FIFO mothers in the present study provide evidence that they experienced similar problems to those identified by FIFO employees. Previous research, which investigated the psychosocial impact of FIFO on employees, found that FIFO was problematic to a degree for all employees and highly problematic for some (Storey & Shrimpton, 1989). These problems included the stress associated with regular partings and reunions, the length of the roster cycle, difficulties with role definition, maintaining ongoing relationships and air safety considerations. (Anderson, 1992; Clarke et al., 1985; John, 1991, Shrimpton & Storey, 1991; Storey & Shrimpton, 1991a). In addition, a number of employees felt trapped by the "golden handcuff" syndrome of enjoying the FIFO rates of pay but hating being away from the family (Adams, 1991; Gillies et al., 1997). Some mothers in the present study also felt they were forced into accepting a FIFO lifestyle for financial reasons. Interestingly, none of the FIFO mothers raised any of the positive issues associated with FIFO employment, rather they focussed on the problems associated with FIFO and how they coped with them, although the feeling of being "voiceless" may have prompted them to discuss negative rather than positive issues.

Comparison with Military Findings

Military families and FIFO families share common risk factors for childhood depression and anxiety. These risk factors are frequent parental absence associated with hazardous employment conditions, and disruption to family routines. Foreman et al. (2001) found elevated levels of depression, anxiety and family dysfunction amongst Western Australian children whose fathers were regularly absent from home as a condition of their employment

in the armed forces. In particular, they found that families whose parents were absent for less than 1 month or more than 5 months suffered less stress than those families whose parents were absent between 1 and 5 months. The present study found no significant differences between children's depression scores for the different roster lengths, although children of parents who were away between 14 and 21 days had lower scores. The cell sizes for each group may have been too small to discover differences and so these results need to be interpreted with caution.

In addition, the military children's mean scores on the CDI (M = 12.3), RCMAS (M = 13.3), and CGF (M = 2.2), were higher than those of the FIFO children on the CDI (M = 7.60), RCMAS (M = 11.0), and CGF (M = 1.87). This indicates that the military children had higher levels of depressive symptomatology and anxiety, and perceptions of family dysfunction (Foreman et al., 2001). It appears that although these two groups of children share common risk factors, they impact differently on each group. Those differences, which were identified in the earlier comparison of military families and FIFO families, may mediate the impact of parental absence on each of the groups. The regularity and duration of absences are different, as are the types of employment related hazards likely to be encountered. The military children came from a different type of residential area than the FIFO group. Further research leading to a better understanding of these mediating factors would allow appropriate strategies to be developed to help overcome the negative impacts of frequent parental absence on children and families.

Limitations of study

This study was limited by the cross-sectional nature of the design, the small sample size and the self-report data. Larger sample sizes would enhance the ability to find small effects. Control of FIFO variables including length of FIFO employment and child's age at commencement of parental FIFO employment would add to the generalisability of future findings.

The Control Group children's surveys were administered in a group setting at school, whereas the FIFO children completed their surveys at home with their mothers close by. The different settings may have influenced the way in which the children responded to the questions. The results should therefore be interpreted with caution and are considered to be only pertinent to this particular population.

Future Directions

This exploratory study provides preliminary indications of the impact of FIFO employment on the psychosocial wellbeing of children. The results indicate that investigation of the psychopathology of children is too narrow a field to adequately determine impact of FIFO on children in particular, and families in general. The findings of significant differences between the two groups of mothers in their perceptions of family function taken together with the issues raised by the FIFO mothers during the interviews, provide a wide field for future research. This includes the association between maternal behaviour and FIFO impacts on children. In conjunction, future research could investigate of the role of protective mechanisms in FIFO children's wellbeing.

From one perspective, it is worrying that the issues raised by mothers during the interviews confirm findings from studies conducted up to 20 years ago. FIFO employment has been part of the Australian mining industry since the 1980s and yet the factors regarded as problematic for families remain the same, acknowledged but not addressed. Although these problematic issues have been consistently identified, easily accessible strategies for reducing their impact may not be available, or may not be effective. As discussed earlier, many Australian families will continue to experience FIFO employment. In order to maximise the positive, and reduce the negative impacts of the lifestyle on families, it is suggested that future research includes the development of practical strategies and programmes which address these issues. This could be done in conjunction with the mining companies. Home problems can have reciprocal effects in the work place. Employees who are constantly worrying about FIFO related home issues impact on staff morale, production and safety. A better understanding of the impacts of FIFO employment on partners and children, and the subsequent development of appropriate strategies to address the problems would be beneficial for families, employees and employers alike.

Conclusion

This study provides an important first step in determining the impacts of parental FIFO employment on the psychosocial wellbeing of their children. It provides preliminary indications that despite being exposed to the risk factors of frequent parental absence associated with hazardous employment conditions, children from FIFO families did not experience significantly higher levels of depressive symptomatology, anxiety and family dysfunction than

non-FIFO children. In addition it identifies that FIFO mothers perceived higher levels of family dysfunction than non-FIFO mothers. These findings also suggest that future research should encompass a wider range of associated areas. This research would contribute to understandings of FIFO employment on children and families in particular, but would also address, in part, Australia's increasing incidence of childhood psychosocial disorders. It is therefore hoped that other researchers will investigate the impacts of FIFO on families.

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Appendix A

Sample Items from the Children's Depression Inventory (Kovacs, 1992).

Directions

Children sometimes have different feelings and ideas. From each group of three sentences pick one sentence that describes you best for the past two weeks. Put a mark in the box beside the sentence that best describes you recently. There is no right or wrong answer.

Item 1

- ☐ I **am** sad once in a while
- ☐ I am sad many times
- ☐ I am sad all of the time

Item 24

- ☐ I **can** never be as good as other kids
- ☐ I **can** be as good as other kids if I want to
- ☐ I am just as good as other kids

Appendix A

Sample Items from the Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 2000).

Directions

Here are some sentences which tell how some people think and feel about themselves. Read each sentence carefully. Circle the word "Yes" if you think it is true about you. Circle the word "No" if you think it is not true about you. Answer every question even if some are hard to decide. Do not circle "Yes" and "No" for the same sentence. There are no right or wrong answers. Only you can tell how you think and feel about yourself.

1. I have trouble making up my mind.....Yes No

10. I worry about what my parents will say to me.....Yes No

35. A lot of people are against me.....Yes No

Appendix A

Sample Items from the McMaster Family Assessment Device

(Epstein, Baldwin, & Bishop, 1983).

Questions about your family

These questions ask you to think carefully about your family **as a whole.** There are 60 statements about families. Please read each statement carefully and decide how well it describes your family. Circle the one answer you think most applies to your family as a whole.

Problem Solving sub-scale

2. We resolve most everyday problems around the house.

Strongly Agree Agree Disagree Strongly Disagree

Communication sub-scale

3. When someone is upset the others know why.

Strongly Agree Agree Disagree Strongly Disagree

Roles sub-scale

10. We make sure family members meet their responsibilities.

Strongly Agree Agree Disagree Strongly Disagree

Affective Responsiveness sub-scale

49. We express tenderness.

Strongly Agree Agree Disagree Strongly Disagree

Affective Involvement sub-scale

5. If someone is in trouble, the others become too involved

Strongly Agree Agree Disagree Strongly Disagree

Behaviour Control sub-scale

20. We know what to do in an emergency.

Strongly Agree Agree Disagree Strongly Disagree

General Functioning sub-scale

6. In times of crisis we can turn to each other for support.

Strongly Agree Agree Disagree Strongly Disagree

Appendix A

Family Information Sheet

We are interested in finding out about your family and your current employment. Some of the questions listed below may not apply to you and therefore you do not need to answer them. However, for questions you feel you want to answer please select the response which best suits you by placing a tick or a cross in the appropriate box. For some of the questions we have asked you to write a response. The answers that you provide are strictly confidential.

1. Your child's name: _____
First name **Surname**

2. How would you describe your family?

[ ] Single parent family
[ ] Nuclear family (e.g. mother, father and children)
[ ] Blended family (e.g. remarried or re-partnered and children)
[ ] Other _____

3. Who in the family is currently employed? (tick all that apply)

[ ] father [ ] mother [ ] someone else (eg sibling)

4. How would you describe your current position?

Child's Father		Child's Mother	
Manager	[ ]	Manager	[ ]
Supervisor	[ ]	Supervisor	[ ]
Technical	[ ]	Technical	[ ]
Trades	[ ]	Trades	[ ]
Apprentice	[ ]	Apprentice	[ ]
Contract	[ ]	Contract	[ ]
Salesperson	[ ]	Salesperson	[ ]
Office Work	[ ]	Office Work	[ ]

Please feel free to describe your current employment

_____

_____

5. Approximately how long have you been employed by your current employer?

Father: _____ _years Mother: _____ ___years

6. During the past 12 months for how many months in total would you say that either parent (or step parent) has been away from home due to work commitments? If you had multiple absences, e.g. 3 trips each lasting 3 weeks, you would say that you had been absent from home for 1 – 3 months in total.

Child's Father	Child's Mother
[ ] never away or not at all	[ ] never away or not at all
[ ] less than one month	[ ] less than one month
[ ] between 1 – 3 months	[ ] between 1 – 3 months
[ ] between 3 – 5 months	[ ] between 3 – 5 months
[ ] between 5 – 7 months	[ ] between 5 – 7 months
[ ] more than 7 months	[ ] more than 7 months
[ ] not applicable	[ ] not applicable

7. Has this pattern of absence been different from other years?

[ ] yes [ ] no [ ] uncertain

Thank you for your time and for completing this information sheet. If you have any questions concerning the study please feel free to contact Mrs Anne Sibbel on 9407 5415 or Dr Elizabeth Foreman on 9400 5193
This information sheet should be forwarded in the envelope provided to Anne Sibbel at Edith Cowan University.

Appendix A

Family Information Sheet
FIFO Families

We are interested in finding out about your family and your current employment. Some of the questions listed below may not apply to you and therefore you do not need to answer them. However, for questions you feel you want to answer please select the response which best suits you by placing a tick or a cross in the appropriate box. For some of the questions we have asked you to write a response. The answers that you provide are strictly confidential.

1. Your child's name: _____
First name **Surname**

2. How would you describe your family?

[ ] Single parent family
[ ] Nuclear family (e.g. mother, father and children)
[ ] Blended family (e.g. remarried or re-partnered and children)
[ ] Other _____

3. Who in the family is currently employed? (tick all that apply)

[ ] father [ ] mother [ ] someone else (eg sibling)

4. How would you describe your current position?

Child's Father		Child's Mother	
Manager	[ ]	Manager	[ ]
Supervisor	[ ]	Supervisor	[ ]
Technical	[ ]	Technical	[ ]
Trades	[ ]	Trades	[ ]
Apprentice	[ ]	Apprentice	[ ]
Contract	[ ]	Contract	[ ]
Salesperson	[ ]	Salesperson	[ ]
Office Work	[ ]	Office Work	[ ]

Please feel free to describe your current employment

_____

_____

5. Approximately how long have you been employed by your current employer?

Father: _____years Mother: _____years

6. Approximately how long has your family been in a fly-in/fly-out lifestyle?

_____

7. How long do you want to continue in a fly-in/fly-out lifestyle?

[ ] less than 1 year
[ ] between 1 - 2 years
[ ] between 2 - 3 years
[ ] between 3 - 4 years
[ ] between 4 - 5 years
[ ] more than 5 years
[ ] unknown

8. How long do you think you will continue in a fly-in/fly-out lifestyle?

[ ] less than 1 year
[ ] between 1 - 2 years
[ ] between 2 - 3 years
[ ] between 3 - 4 years
[ ] between 4 - 5 years
[ ] more than 5 years
[ ] unknown

9. What is the length of your partner's roster cycle? Please circle whether it is days or weeks.

Home [ ] days/weeks Away [ ] days/weeks

10. Have you experienced different roster cycle lengths?

[ ] Yes [ ] No

11. What is your preferred roster cycle? Please circle whether it is days or weeks

Home [ ] days/weeks Away [ ] days/weeks

Thank you for your time and for completing this information sheet. If you have any questions concerning the study please feel free to contact Mrs Anne Sibbel on 9407 5415 or Dr Elizabeth Foreman on 9400 5193. This information sheet should be forwarded in the envelope provided to Anne Sibbel at Edith Cowan University.

Appendix B

Introductory Letter to Mining Company

Anne Sibbel
School of Psychology
Edith Cowan University
JOONDALUP WA

Mr G Lang
Managing Director
Homestake Gold of Australia Ltd
PERTH WA 6000

Dear Mr Lang

This year I am completing honours in Psychology at Edith Cowan University, Joondalup and my research topic is concerned with examining the psychological impact of a fly-in/fly-out lifestyle on mining families, particularly mothers and children.

This study has been approved by the School of Psychology Ethics Committee.

In order to conduct my research I need to be able to contact families with primary school aged children who have fly-in/fly-out employment. I was wondering if Homestake would be interested in becoming involved in this project and could assist by forwarding details of the project to your fly-in/fly-out employees. I am particularly interested in contacting employees who have children who are between 7 and 12 years of age, but if this detail is not available I will contact all of your fly-in/fly-out employees. I have attached a copy of the letter I intend to use. I hope that I could also include a short letter from the company indicating its support for the project.

The children who agree to participate will be asked to complete three short questionnaires which include questions about how they feel about themselves, about their mood and about everyday events in their lives. The mothers will also be asked to complete two short questionnaires. It is expected these will take about 45 minutes to complete. They will be completed at a time and place convenient to the families. Both mothers and children may choose not to answer any questions they don't want to and they will be welcome to stop or withdraw at any time if they wish. Their participation in the project will be voluntary and the information gathered will be treated in the strictest of confidence. Any reports which result from this study will only discuss overall results and children or parents will <u>not</u> be identified in any way whatsoever. If any of the children show any reason for concern the parents will be contacted. You will be provided with a copy of the completed study.

In order to proceed with the project I need consent from you in writing that Homestake is willing to allow me to contact their families to invite them to participate.

If you need any further information please contact me on 9407 5415 or contact my supervisor Dr Elizabeth Foreman on 9400 5193. We are both happy to meet with you to explain the project in more detail and to answer any questions.

Thank you very much for your time and for allowing me this opportunity.

Yours sincerely

Anne Sibbel
DATE

Appendix B

Introductory Letter to Mining Families

Dear Parents

Your husband/partner's employer, Homestake Mining – Australia has agreed to participate in a study which is being conducted by Anne Sibbel, an Honours Student in Psychology at Edith Cowan University, and supervised by Dr Elizabeth Foreman. This study has been approved by the School of Psychology Ethics Committee.

This study is designed to look at the well-being of mothers and their primary school-aged children who are members of fly-in/fly-out families. As your family is involved in a fly-in/fly-out lifestyle we are inviting you and your child/children to be part of this study. We know that everyone is different in their opinions so it is important to include as many mothers and children as possible. In the long run we hope this information will be used to assist with the provision of services for families involved in fly-in/fly-out employment.

If you both agree to participate, you will both be asked a series of questionnaires at a time and place convenient to you. The child's questionnaire will include questions about how they feel about themselves, their mood and about everyday events in their lives. In addition you will also be asked to complete two short questionnaires about your family. It is expected this will take about 45 minutes to complete. Both you and your child may choose not to answer any questions you don't want to, and you will be welcome to stop or withdraw at any time if you wish.

Your participation in this project is voluntary and the information gathered will be treated in the strictest of confidence. Any reports which result from this study will only discuss overall results and children or parents will <u>not</u> be identified in any way whatsoever. If any of the children show any reason for concern the parents concerned will be contacted.

If you and your child would like to participate please fill out the consent form and return it in the enclosed stamped and addressed envelope by DATE. Please include your phone number so I can contact you to arrange a time and place for the interview.

If you have any questions please do not hesitate to contact:
Mrs Anne Sibbel on 9407 5415
Dr Elizabeth Foreman on 9400 5193
Wendy Majid at Homestake 9212 5777

Please keep this letter for your information. We would really appreciate your help to make this study possible.

Yours sincerely,

Mrs Anne Sibbel
With Dr Elizabeth Foreman

Appendix B

EDITH COWAN UNIVERSITY

Consent to participation in research

FIFO Families

I have read through the letter of introduction and understand the nature and the purpose of the research project being conducted by Mrs. Anne Sibbel and supervised by Dr. Elizabeth Foreman. I am satisfied with the explanations provided in the letter and consent to my participation.

I also consent to my child/children participating in this study. I understand that my child/children will be asked to complete a series of questionnaires.

Child/Children's name(s): _____

Child/Children's age(s): _____

Name of Parent/Guardian: _____

Signed: _____

Date: _____

Phone: _____

Could you please return this form to me in the envelope provided by DATE.
I will then call you to arrange a time to meet.

Thank you for your support.

Appendix C

Introductory Letter to School Principal

Anne Sibbel
School of Psychology
Edith Cowan University
JOONDALUP WA 6027

Mr A Shaw
Principal
Peter Moyes Anglican Community School
MINDARIE WA 6030

Dear Mr Shaw

This year I am completing honours in Psychology at Edith Cowan University. Joondalup and my research topic is concerned with examining the psychological impact of a fly-in/fly-out lifestyle on mining families, particularly mothers and children.

This study has been approved by the School of Psychology Ethics Committee.

In order to conduct my research I need to be able to contact families with primary school aged children who are not employed in a fly-in/fly-out capacity. I was wondering if your school would be interested in becoming involved in this project and could assist by forwarding details of the project to the school's families. I would like to contact all families who have children in years 7. I have attached a copy of the letter I intend to send out and I hope that through the school newsletter you could also inform the parents of the school's support for the project.

Children will be asked to complete three short questionnaires which include questions about how they feel about themselves, about their mood and about everyday events in their lives. It is expected this will take about 45 minutes to complete and I hope to administer it in group settings at the school. The mothers will also be asked to complete two short questionnaires about their family and these can be completed in their own time at home. Both mothers and children may choose not to answer any questions they don't want to and they will be welcome to stop or withdraw at any time if they wish. Their participation in the project will be voluntary and the information gathered will be treated in the strictest of confidence. Any reports which result from this study will only discuss overall results and children or parents will <u>not</u> be identified in any way whatsoever. If any of the children show any [illegible] on for concern the school will be contacted. You will be provided with a copy of the completed study.

In order to proceed with the project I need consent from you in writing that the school is willing to allow me to contact their families to invite them to participate.

If you need any further information please contact me on 9407 5415 or contact my supervisor Dr Elizabeth Foreman on 9400 5193. We are both happy to meet with you to explain the project in more detail and to answer any questions.

Thank you very much for your time and for allowing me this opportunity.

Yours sincerely

Anne Sibbel

DATE

Appendix C

Introductory Letter to School Families

Dear Parent

Your school has agreed to participate in a study being conducted by Anne Sibbel an Honours Student in Psychology at Edith Cowan University, and supervised by Dr Elizabeth Foreman. The study has been approved by the School of Psychology Ethics Committee.

We hope that this study will help us understand more about how primary school aged children think about themselves and how this might change as they get older, and we are inviting you to be part of this study. We know that each child is different in their opinions so it is important to include as many children as possible. We are also interested in how mothers think about their families. This study includes looking at the impact of lifestyle differences such as fly-in/fly-out employment. In the long run the aim is to use this information to help children feel better about themselves.

If you both agree to participate your child will answer a questionnaire in class time during a period set aside for this purpose. The questionnaire includes questions on how they feel about themselves, their mood and about everyday events in their lives.

Mothers are asked to complete the accompanying two questionnaires. It is anticipated they will take about 20 minutes to complete. You may choose not to answer any questions you don't want to, and you are welcome to stop or withdraw at any time if you wish.

Your participation in this project is voluntary and the information gathered will be treated in the strictest of confidence. Any reports which result from his study will only discuss overall results and children or parents will not be identified in any way whatsoever. However, if any of the children from the school show any reason for concern, information will be discussed confidentially with the school and if there are any problems the parents concerned will be contacted by me.

If you and your child would like to participate please fill out the consent form and the two questionnaires, place them in the envelope provided and return them to the box marked ECU Project in the Administration area at the school or post it directly to me at Edith Cowan University by DATE.

Please keep this letter for your information and if you have any questions please do not hesitate to contact :
Mrs Anne Sibbel - Phone: 9407 5415
Dr Elizabeth Foreman - Phone: 9400 5193
We would really appreciate your help to make this study possible.

Yours sincerely

Mrs Anne Sibbel
With Dr Elizabeth Foreman

Appendix C

EDITH COWAN UNIVERSITY

Consent to participation in research
School Families

I have read through the letter of introduction and understand the nature and the purpose of the research project being conducted by Mrs. Anne Sibbel and supervised by Dr. Elizabeth Kaczmarek. I am satisfied with the explanations provided in the letter and consent to my participation.

I also consent to my child/children participating in this study. I understand that my child/children will be asked to complete a survey in school time.

Child/Children's name(s):_____

Child/Children's age(s): _____

Name of Parent/Guardian: _____

Signed:_____

Date: _____

Phone: _____

Could you please return this form to me, together with the two completed surveys, in the envelope provided by DATE.

Thank you for your support.

Appendix D

Key for Variables in Children's Raw Data Table

Column Label	**Variable**
Participant Number	Participant Identification Number
Group	1 = FIFO 2 = Control
Sex	1 = male 2 = female
Age	Child's Age in Years
FIFO	Number of Years of FIFO Employment
Preferred Roster	Preferred FIFO roster 1 = 2 weeks away/ 1 week home 2 = 12 days away/ 2 days home 3 = 6 weeks away/ 6 weeks home 4 = 9 days away/ 5 days home 5 = 14 days away/ 4 days home 6 = 3 weeks away/ 1 week home 7 = 3 weeks away/ 6 weeks home 8 = 4 weeks away/ 4 weeks home 9 = 2 weeks away/ 2 weeks home 10 = 1 week away/ 1 week home 11 = 10 days away/ 5 days home 12 = 4 weeks away/ 1 week home 13 = 2 weeks away/ 4 weeks home 14 = 0 weeks away/ 52 weeks home 15 = 5 days away/ 2 days home 16 = 16 days away/ 10 days home

Column Label	Variable
Present Roster	Current FIFO roster 1 = 2 weeks away/ 1 week home 2 = 12 days away/ 2 days home 3 = 6 weeks away/ 6 weeks home 4 = 9 days away/ 5 days home 5 = 14 days away/ 4 days home 6 = 3 weeks away/ 1 week home 7 = 3 weeks away/ 6 weeks home 8 = 4 weeks away/ 4 weeks home 9 = 2 weeks away/ 2 weeks home 10 = 1 week away/ 1 week home 11 = 10 days away/ 5 days home 12 = 4 weeks away/ 1 week home 13 = 2 weeks away/ 4 weeks home 14 = 0 weeks away/ 52 weeks home 15 = 5 days away/ 2 days home 16 = 16 days away/ 10 days home
Grouped Roster	Grouped FIFO Roster 1 = away less than 14 days 2 = away 14 to 20 days 3 = away 21 days or more
Family Type	1 = single parent family 2 = nuclear family 3 = blended family 4 = other type of family
CDI	Child's Score on Children's Depression Inventory
RCMAS	Child's Score on the Revised Children's Manifest Anxiety Scale
CFAD	Child's Score on the General Functioning sub-scale of the FAD

Appendix D

FIFO and Control Group Children's Raw Data

Participant Number	Group	Sex	Age	Years FIFO	Preferred Roster	Present Roster	Grouped Roster	Family Type	CDI Score	RCMAS Score	CFAD Score
1	1	2	8	.30	11	11	1	2	4.00	17.00	1.33
2	1	2	10	7.00	13	12	3	2	12.00	21.00	1.42
3	1	1	11	.80	14	5	2	2	3.00	4.00	1.50
4	1	2	10	.80	14	5	2	2	6.00	13.00	1.58
5	1	1	8	6.00	14	4	1	2	6.00	8.00	1.50
6	1	1	9	4.00	8	3	3	2	13.00	20.00	2.33
7	1	1	11	8.00	14	2	1	4	3.00	17.00	1.25
8	1	1	12	13.00	1	1	2	2	5.00	12.00	2.00
9	1	1	12	3.00	1	6	3	2	2.00	11.00	1.58
10	1	1	9	5.00	9	4	1	2	7.00	1.00	2.08
11	1	2	9	5.00	9	4	1	2	6.00	9.00	2.50
12	1	1	12	12.00	1	1	2	2	1.00	2.00	1.83
13	1	2	9	11.00	7	8	3	2	13.00	25.00	1.67
14	1	1	11	8.00	1	4	1	3	23.00	6.00	2.75
15	1	2	9	8.00	1	4	1	3	4.00	4.00	2.17
16	1	2	9	2.50	10	9	2	2	5.00	11.00	1.83
17	1	1	9	13.00	8	12	3	2	16.00	12.00	2.17
18	1	2	12	5.00	9	1	2	2	8.00	13.00	2.25
19	1	1	9	5.00	9	1	2	2	5.00	11.00	2.83
20	1	2	10	5.00	4	4	1	2	21.00	23.00	1.92
21	1	2	10	12.00	8	4	1	2	9.00	4.00	1.92
22	1	2	11	8.00	9	1	2	4	.00	4.00	1.83
23	1	1	9	1.00	4	4	1	3	5.00	3.00	1.75

Participant Number	Group	Sex	Age	Years FIFO	Preferred Roster	Present Roster	Grouped Roster	Family Type	CDI Score	RCMAS Score	CFAD Score
24	1	2	10	10.00	4	1	2	2	1.00	4.00	1.42
25	1	2	11	.50	4	4	1	2	16.00	16.00	1.50
26	1	2	12	.50	4	4	1	2	6.00	6.00	1.17
52	1	2	9	2.00	14	4	1	2	11.00	21.00	2.25
54	1	1	11	6.50	14	7	3	2	2.00	8.00	1.75
57	1	2	12	13.00	14	15	1	2	8.00	8.00	2.00
58	1	2	11	3.00	15	16	2	3	7.00	16.00	2.08
27	2	2	8					2	5.00	7.00	1.92
28	2	2	10					2	3.00	3.00	1.17
29	2	1	11					2	.00	5.00	1.67
30	2	1	8					2	4.00	.00	2.00
31	2	1	9					2	6.00	6.00	1.50
32	2	1	11					2	1.00	2.00	1.17
33	2	2	12					2	12.00	6.00	2.67
34	2	1	12					2	4.00	13.00	1.67
35	2	1	12					2	1.00	14.00	1.67
36	2	1	9					2	10.00	10.00	2.25
37	2	2	10					2	3.00	.00	2.25
38	2	1	12					2	3.00	7.00	1.83
39	2	2	9					2	2.00	8.00	2.50
40	2	1	11					2	3.00	1.00	1.75
41	2	1	9					2	10.00	5.00	1.75
42	2	1	9					4	3.00	8.00	1.17
43	2	2	11					2	.00	4.00	1.33
44	2	1	9					4	4.00	.00	2.17
45	2	2	12					2	9.00	13.00	1.75

Participant Number	Group	Sex	Age	Years FIFO	Preferred Roster	Present Roster	Grouped Roster	Family Type	CDI Score	RCMAS Score	CFAD Score
46	2	2	9					1	9.00	12.00	2.08
47	2	2	9					2	1.00	1.00	2.08
48	2	2	9					2	8.00	16.00	1.75
49	2	2	9					2	6.00	12.00	2.00
50	2	2	11					2	12.00	15.00	1.83
51	2	2	10					2	4.00	14.00	1.33
53	2	2	9					2	11.00	22.00	1.75
55	2	1	11					2	7.00	16.00	2.33
56	2	2	10					2	1.00	.00	1.58
59	2	2	12					2	2.00	8.00	2.00
60	2	2	11					2	6.00	17.00	1.75

Key for Variables in Mothers' Raw Data Table

Column Label	**Variable**
Participant Number	Participant Identification Number
Group	1 = FIFO 2 = Control
PS Score	Mother's Score on the Problem Solving sub-scale of the McMaster Family Assessment Device
CO Score	Mother's score on the Communication sub-scale of the McMaster Family Assessment Device
RO Score	Mother's score on the Roles sub-scale of the McMaster Family Assessment Device
AR Score	Mother's score on the Affective Responsiveness sub-scale of the McMaster Family Assessment Device
AI Score	Mother's score on the Affective Involvement sub-scale of the McMaster Family Assessment Device
BC Score	Mother's score on the Behaviour Control sub-scale of the McMaster Family Assessment Device
PGF	Mother's Scores on the General Functioning sub-scale of the McMaster Family Assessment Device

Appendix D

FIFO and Control Group Mothers' Raw Data

Participant Number	Group	PS Score	CO Score	RO Score	AR Score	AI Score	BC Score	PGF Score
1	1	1.83	2.00	2.09	1.67	1.43	1.67	1.58
2	1	1.33	1.11	2.09	1.50	1.57	1.78	1.33
3	1	2.00	2.22	2.36	2.00	2.14	2.00	2.00
4	1	2.00	2.22	2.36	2.00	2.14	2.00	2.00
5	1	2.00	2.44	2.18	1.50	2.14	1.67	1.75
6	1	1.83	2.00	2.09	2.17	2.14	1.78	1.83
7	1	2.00	2.11	1.91	1.83	2.00	1.67	1.75
8	1	1.67	2.00	2.45	1.17	2.00	2.00	1.83
9	1	2.17	1.89	2.45	2.17	2.43	1.67	1.58
10	1	1.17	2.22	2.55	1.50	2.86	2.00	1.00
11	1	1.17	2.22	2.55	1.50	2.86	2.00	1.00
12	1	2.00	2.00	2.36	1.50	2.00	1.56	1.83
13	1	1.33	1.78	1.64	1.33	2.14	1.44	1.42
14	1	1.83	1.89	1.82	2.00	2.14	1.89	1.92
15	1	1.83	1.89	1.82	2.00	2.14	1.89	1.92
16	1	2.17	3.67	3.36	3.50	3.71	2.67	3.17
17	1	2.17	2.11	2.73	2.00	2.29	1.67	1.83
18	1	2.17	2.22	2.27	2.67	2.29	2.11	2.00
19	1	2.17	2.22	2.27	2.67	2.29	2.11	2.00
20	1	2.00	2.00	2.45	2.17	2.14	1.67	2.25
21	1	1.50	1.78	2.00	1.67	1.57	1.67	1.67
22	1	2.17	2.22	2.27	2.00	2.43	1.78	1.92

Participant Number	Group	PS Score	CO Score	RO Score	AR Score	AI Score	BC Score	PGF Score
23	1	1.33	1.67	2.18	1.33	1.86	1.89	1.58
24	1	2.33	2.22	2.45	2.00	2.00	1.56	1.92
25	1	2.00	2.11	2.45	2.00	2.29	1.89	2.00
26	1	2.00	2.11	2.45	2.00	2.29	1.89	2.00
52	1	2.17	2.33	2.45	2.17	2.14	2.11	1.92
54	1	2.00	2.44	2.18	2.17	2.43	1.89	2.17
57	1	2.17	2.11	2.55	2.17	2.43	2.00	1.92
58	1	2.17	2.89	2.91	2.33	2.86	1.67	2.08
27	2	2.17	2.00	2.27	2.00	2.29	2.22	2.00
28	2	2.17	2.00	2.27	2.00	2.29	2.22	2.00
29	2	1.17	1.11	1.36	1.00	1.14	1.11	1.00
30	2	1.67	2.22	2.36	1.83	2.00	1.44	1.42
31	2	1.83	2.22	2.18	2.00	2.00	1.89	1.83
32	2	2.17	2.44	2.36	2.00	2.00	1.89	2.00
33	2	1.33	1.89	1.27	2.33	1.57	1.00	2.00
34	2	1.50	1.67	2.36	1.67	2.00	1.78	1.50
35	2	2.00	2.11	2.27	1.67	1.71	1.56	1.42
36	2	2.00	1.89	2.09	1.00	1.86	1.22	1.42
37	2	2.00	1.78	2.00	1.67	2.00	1.67	2.00
38	2	1.67	1.44	1.55	1.33	1.29	1.67	1.17
39	2	1.33	1.22	1.45	1.00	1.57	1.11	1.00
40	2	1.67	1.56	2.55	1.17	2.29	1.44	1.50
41	2	1.67	1.78	1.91	1.33	1.43	1.44	1.42
42	2	1.50	1.78	2.18	1.67	1.43	1.22	1.00
43	2	1.67	1.78	2.18	1.33	2.00	1.44	1.33
44	2	2.50	2.22	2.91	1.67	2.57	1.44	2.50

Participant Number	Group	PS Score	CO Score	RO Score	AR Score	AI Score	BC Score	PGF Score
45	2	2.17	1.44	2.18	2.00	2.00	1.67	1.67
46	2	1.83	2.00	2.18	1.83	1.71	1.78	1.58
47	2	1.67	1.44	1.64	1.83	1.86	1.11	1.58
48	2	2.00	2.11	2.00	2.00	2.00	1.56	1.92
49	2	2.00	2.00	2.27	1.17	1.43	1.56	1.25
50	2	2.00	2.22	2.45	2.00	2.14	2.00	1.92
51	2	1.50	1.78	1.36	1.50	1.57	1.11	1.08
53	2	2.00	1.89	1.73	1.50	1.86	1.67	1.58
55	2	1.50	1.67	2.36	1.67	2.00	1.78	1.50
56	2	1.17	1.22	1.36	1.83	1.14	1.44	1.50
59	2	2.00	1.56	2.45	1.17	1.57	1.67	1.33
60	2	1.33	1.44	2.09	1.17	1.86	1.78	1.42

Appendix E

Key for Variables in Analysis Tables

Abbreviation	**Variable**
CDI	Children's Depression Inventory
CFAD	Children's Scores on the General Functioning sub-scale of the FAD
Control	Control Group
FAD 1	Problem Solving sub-scale of the FAD
FAD 2	Communication sub-scale of the FAD
FAD 3	Roles sub-scale of the FAD
FAD 4	Affective Responsiveness sub-scale of the FAD
FAD 5	Affective Involvement sub-scale of the FAD
FAD 6	Behaviour Control sub-scale of the FAD
FIFO	Fly-in/fly-out Group
Group	FIFO and Control Group
PGENFUN	Mother's Scores on the General Functioning sub-scale of the FAD
RCMAS	Revised Children's Manifest Anxiety Scale

Appendix E

Independent Samples *t* tests

Independent samples *t* tests comparing the FIFO group with the Control Group on:

1. anxiety (RCMAS)
2. children's perceptions of family function (CFAD)
3. mother's perceptions of family function (PGENFUN)
4. depressive symptomatology (CDI)

Group Statistics

	group	N	Mean	Std. Deviation	Std. Error Mean
RCMAS	fifo child	30	11.0000	6.7569	1.2336
	control child	30	8.1667	6.0747	1.1091
CFAD	fifo child	30	1.8722	.4208	7.683E-02
	control child	30	1.8222	.3801	6.940E-02
PGENFUN	fifo child	30	1.8389	.3884	7.091E-02
	control child	30	1.5611	.3635	6.637E-02
CDI	fifo child	30	7.6000	5.7631	1.0522
	control child	30	5.0000	3.6578	.6678

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
RCMAS	Equal variances assumed	.269	.606	1.708	58	.093	2.8333	1.6589	.4873	6.1540
	Equal variances not assumed			1.708	57.355	.093	2.8333	1.6589	-.4881	6.1548
CFAD	Equal variances assumed	.463	.499	.483	58	.631	5.000E-02	.1035	-.1572	.2572
	Equal variances not assumed			.483	57.411	.631	5.000E-02	.1035	-.1573	.2573
PGENFUN	Equal variances assumed	.295	.589	2.860	58	.006	.2778	9.712E-02	8.337E-02	.4722
	Equal variances not assumed			2.860	57.748	.006	.2778	9.712E-02	8.335E-02	.4722
CDI	Equal variances assumed	3.344	.073	2.086	58	.041	2.6000	1.2462	.1054	5.0946
	Equal variances not assumed			2.086	49.102	.042	2.6000	1.2462	9.573E-02	5.1043

Appendix E

Standard Multiple Regression Analysis

A standard multiple regression analysis was performed with CDI (depression) as the criterion variable and Group (FHO or Control), RCMAS (anxiety), CFAD (children's perceptions of family function) and PGENFUN (mother's perceptions of family function) as the predictor variables.

Descriptive Statistics

	Mean	Std. Deviation	N
CDI	6.3000	4.9619	60
group	1.50	.50	60
PGENFUN	1.7000	.3984	60
CFAD	1.8472	.3984	60
RCMAS	9.5833	6.5284	60

Correlations

		CDI	group	PGENFUN	CFAD	RCMAS
Pearson Correlation	CDI	1.000	-.264	.191	.349	.522
	group	-.264	1.000	-.352	-.063	-.219
	PGENFUN	.191	-.352	1.000	.070	.014
	CFAD	.349	-.063	.070	1.000	-.006
	RCMAS	.522	-.219	.014	-.006	1.000
Sig. (1-tailed)	CDI		.021	.072	.003	.000
	group	.021		.003	.315	.046
	PGENFUN	.072	.003		.296	.459
	CFAD	.003	.315	.296		.482
	RCMAS	.000	.046	.459	.482	
N	CDI	60	60	60	60	60
	group	60	60	60	60	60
	PGENFUN	60	60	60	60	60
	CFAD	60	60	60	60	60
	RCMAS	60	60	60	60	60

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	RCMAS, CFAD, PGENFUN, group[a]		Enter

a All requested variables entered

b Dependent Variable: CDI

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.654[a]	.428	.386	3.8875

a Predictors: (Constant), RCMAS, CFAD, PGENFUN, group

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	621.418	4	155.355	10.280	.000[a]
	Residual	831.182	55	15.112		
	Total	452.600	59			

a Predictors: (Constant), RCMAS, CFAD, PGENFUN, group

b Dependent Variable: CDI

Appendix E

Kruskal-Wallis Chi Square Approximation

A Kruskal Wallis test was performed to determine the impact of father's length of time away on children's depressive symptomatology. The FIFO Group's current rosters were collapsed into three groups to form the independent variables and the dependent variable was FIFO children's depressive symptomatology as assessed by the Children's Depression Inventory (CDI).

Ranks[a]

	grouped rosters	N	Mean Rank
CDI	away less than 14 days	14	18 00
	away 14 days to 20days	10	10 15
	away 21 days or more	6	18 58
	Total	30	

a group = fifo child

Test Statistics[a,b,c]

	CDI
Chi-Square	5 593
df	2
Asymp Sig	061

a Kruskal Wallis Test

b Grouping Variable grouped rosters

c group = fifo child

Appendix E

Multivariate Analysis of Variance (MANOVA)

A between subjects MANOVA was performed with the independent variable of group (FIFO or Control), and dependent variables of the McMaster Family Assessment Device sub-scales of Problem Solving (FAD 1), Communication (FAD 2), Roles (Fad 3), Affective Responsiveness (Fad 4), Affective Involvement (FAD 5), Behaviour Control (FAD 6), and General Functioning (PGENFUN).

General Linear Model

Between-Subjects Factors

		Value Label	N
group	1	fifo child	30
	2	control child	30

Descriptive Statistics

	group	Mean	Std. Deviation	N
FAD2	fifo child	2.1370	.4154	30
	control child	1.7963	.3379	30
	Total	1.9667	.4129	60
FAD3	fifo child	2.3242	.3399	30
	control child	2.0545	.4119	30
	Total	2.1894	.3983	60
FAD4	fifo child	1.9556	.4713	30
	control child	1.6111	.3697	30
	Total	1.7833	.4544	60
FAD5	fifo child	2.2381	.4348	30
	control child	1.8190	.3498	30
	Total	2.0286	.4447	60
FAD6	fifo child	1.8519	.2377	30
	control child	1.5630	.3196	30
	Total	1.7074	.3149	60
PGENFUN	fifo child	1.8389	.3884	30
	control child	1.5611	.3635	30
	Total	1.7000	.3984	60
FAD1	fifo child	1.8889	.3314	30
	control child	1.7722	.3347	30
	Total	1.8306	.3354	60

Box's Test of Equality of Covariance Matrices[a]

Box's M	61 372
F	1 908
df1	28
df2	11722 105
Sig	003

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups

a. Design: Intercept+GROUP

Multivariate Tests[b]

Effect		Value	F	Hypothesis df	Error df	Sig
Intercept	Pillai's Trace	982	416 968[a]	7 000	52 000	000
	Wilks' Lambda	018	416 968[a]	7 000	52 000	000
	Hotelling's Trace	56 130	416 968[a]	7 000	52 000	000
	Roy's Largest Root	56 130	416 968[a]	7 000	52 000	000
GROUP	Pillai's Trace	288	3.002[a]	7 000	52 000	010
	Wilks' Lambda	712	3 002[a]	7 000	52 000	010
	Hotelling's Trace	404	3 002[a]	7 000	52.000	010
	Roy's Largest Root	404	3.002[a]	7 000	52 000	010

a. Exact statistic

b. Design: Intercept+GROUP

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig
FAD2	.083	1	58	775
FAD3	1.902	1	58	173
FAD4	.110	1	58	741
FAD5	.005	1	58	941
FAD6	2 638	1	58	.110
PGENFUN	.295	1	58	.589
FAD1	.185	1	58	.669

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+GROUP

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig
Corrected Model	FAD2	1 742[a]	1	1 742	12 148	001
	FAD3	1 091[b]	1	1 091	7 653	008
	FAD4	1 780[c]	1	1 780	9 921	003
	FAD5	2 634[d]	1	2 634	16 916	000
	FAD6	1 252[e]	1	1 252	15 787	000
	PGENFUN	1 157[f]	1	1 157	8 180	006
	FAD1	204[g]	1	204	1 840	180
Intercept	FAD2	232 067	1	232 067	1618 701	000
	FAD3	287 607	1	287 607	2017 281	000
	FAD4	190 817	1	190 817	1065 791	000
	FAD5	246 906	1	246 906	1585 660	000
	FAD6	174 914	1	174 914	2205 837	000
	PGENFUN	173 400	1	173 400	*225 519	000
	FAD1	201 056	1	201 056	1812 369	000
GROUP	FAD2	1 742	1	1 742	12 148	001
	FAD3	1 091	1	1 091	7 653	008
	FAD4	1 780	1	1 780	9 921	003
	FAD5	2 634	1	2 634	16 916	000
	FAD6	1 252	1	1 252	15 787	000
	PGENFUN	1 157	1	1 157	8 180	006
	FAD1	204	1	204	1 840	180
Error	FAD2	8 315	58	143		
	FAD3	8 269	58	143		
	FAD4	10 404	58	179		
	FAD5	9 031	58	156		
	FAD6	4 599	58	7 930E-02		
	PGENFUN	8 206	58	141		
	FAD1	6 434	58	111		
Total	FAD2	242 123	60			
	FAD3	296 967	60			
	FAD4	203 000	60			
	FAD5	258 571	60			
	FAD6	180 765	60			
	PGENFUN	182 764	60			
	FAD1	207 694	60			
Corrected Total	FAD2	10 057	59			
	FAD3	9 360	59			
	FAD4	12 183	59			
	FAD5	11 665	59			
	FAD6	5 851	59			
	PGENFUN	9 364	59			
	FAD1	6 638	59			

[a] R Squared = 173 (Adjusted R Squared = 159)

[b] R Squared = 117 (Adjusted R Squared = 101)

[c] R Squared = 146 (Adjusted R Squared = 131)

[d] R Squared = 226 (Adjusted R Squared = 212)

[e] R Squared = 214 (Adjusted R Squared = 200)

[f] R Squared = 124 (Adjusted R Squared = 108)

[g] R Squared = 031 (Adjusted R Squared = 014)